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The Zone System Deserves a Fair Trial

THE zone system of fares proposed by the Massachusetts Public Service Commission for the Holyoke Street Railway, although novel in a number of its features, is not a revolutionary move in urban transportation. Other urban zone systems exist in this country, and the plan is growing in popularity for suburban and interurban service, one particularly successful application being that on the Shore Line Electric Railway, as described in this issue. The authorization of

such a system for Holyoke has a peculiar significance at this time, when the question of the best method of increasing fares is so acute, and the comments of the Massachusetts Public Service Commission in approving the company's preference should be carefully noted. This body does not find the results of 6-cent fares in Massachusetts especially encouraging, and it is impressed with the possible usefulness of a zone system with a central 5-cent area for some localities. Finding Holyoke a proper subject, it applies such a remedy, without binding itself to the same treatment for future patients. Its attitude is summed up in words which amount substantially to these: "This treatment should have a fair trial." With this we agree most heartily. Without casting any aspersions upon companies that are experimenting with 6-cent fares

—nor do we think the commission intended so to do—we feel that it is to the interests of the industry that the zone system of charging be tried more widely, in spite of any difficult study necessary, in order to establish the conditions of successful operation. The railways have much to learn about rate-making, but a one-sided experimentation might only injure them. Perhaps all the different methods of increasing revenues will prove their usefulness under varying conditions. In any case prompt and thorough trials are needed for future guidance. The industry should take the lead in this matter, at least as far as it can, and not leave the initiative to the commissions.

Line Losses Are Not All in the Wires

IN TRANSMISSION lines operating at very high voltages, 60,000 or higher, losses over the insulators and through the atmosphere assume formidable proportions. These losses, or rather the costs of mitigating them, form a considerable factor in limiting the voltage. Anyone who has observed a high-voltage line on a dark night has noted the blue corona around the insulators and possibly on the wires also. This represents power loss, the air being heated thereby. At high altitudes the loss is very serious, due to the rarefaction of the air, which loses its insulating properties at low pressure. The so-called vacuum tube illustrates this phenomenon, for such a tube contains air or other gas at a pressure of a few millimeters of mercury, and is a fair conductor. A true vacuum is, of course, a perfect insulator. Data on the subject of line losses are fairly plentiful but accessible mainly to the specialist because embedded in technical language. In this issue is an article by Professor D. D. Ewing giving in more popular style the results of some studies conducted on an electric railway line in the Middle West. To make his article complete he has had to use some geometrical diagrams which will naturally appeal only to electrical engineers, but aside from these there is much of general value and interest in the article. With

the comparatively low voltage of 33,000 used on the line tested the leakage losses are not serious, but the results clearly illustrate the principles involved. Owing to the fact that the routine of electric railway operation leaves little time for research work except that directly necessitated by the exigencies of the hour, we must depend upon outsiders to obtain data like those given in the present article. The technical departments of universities located near railway lines are well equipped to make necessary tests; all that is needed is that the railway men formulate their research problems and submit them to the college laboratories for solution.

The First Condition of Peace

DID you notice particularly the first item in President Wilson's most admirable summary of the Allied peace aims? "Open covenants of peace, openly arrived at" . . . "No private international understandings" . . . "Diplomacy always frank and in the public view"—why, that is simply free and frank PUBLICITY!

President Wilson knows what publicity in diplomacy will prevent, and what it will accomplish. The powers of darkness cannot avail in the full light of day. The public gives its support only to what it understands. Hence our leader places publicity as the cornerstone for the beautiful edifice of a world made safe for democracy.

This has a meaning to those in public utility service as well. The age is one of publicity. When the last stronghold of secrecy and intrigue in the Old World is falling, there is no place for it in the New.

Does it seem trite to urge publicity after so much ink has been used on this subject? Not when the following can occur:

Installation of a higher fare without a word of explanation to the public.

Adoption of a new fare-collection system, leaving the rider to guess where he gets on or off (to speak literally).

Wake up—the world has moved, and this is the day when the public must know.

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Don't Let Them Forget About Daylight Saving

IN ALL the zeal of carrying on campaigns for higher fares and co-operating with the government in the various suggested ways for the conserving of fuel, it should not be forgotten that one desired innovation has not yet been effected—daylight saving. A bill to turn back the clock one hour during the warm months was passed by the Senate at the last session but was held up in the House. This matter should now be enacted into law. Daylight saving would be a boon to the nation's workers, and the inertia of conservatism, the only opponent, should be overcome. It may be quite proper not to be the first to cast the old aside, but it is just as fitting not to be the last by whom the new is tried. In daylight saving we have already lagged behind European nations too much. This is something the War Board would do well to keep before the authorities in Washington.

Standardization and Other Points Shown by the Car Statistics

THE table of car statistics published last week presents a number of interesting facts, besides giving a record of the total number of cars ordered or built during the year for electric railway purposes. One of these facts is very gratifying as indicating a real approach toward that standardization of car design which has been the ideal for so many years.

Last year was the first in the history of electric railroading when scores of cities bought exactly the same car, in this case the Birney safety type. This fact at least disposes of the contention that "local conditions" have a controlling influence in determining the exact length, to the fraction of an inch, of a car which can be operated on the streets of any particular city. But if railways have been able to standardize on safety cars, there does not seem to be any particular reason why they should not be able to standardize also on cars of greater length, at least to the extent of not requiring the car builder to get out an entirely new set of drawings so that a car may be a few inches longer, or shorter, than the one he has just built.

On questions of the style of car there may be greater differences of opinion, but even here local conditions, we believe, if analyzed carefully, will not infrequently be found to be "local prejudices." Incidentally, among the larger cars ordered in 1917, there was an evident tendency to use the Peter Witt pay-as-you-pass car, although we do not think that the chief benefits to be derived from car standardization necessarily require the same arrangement of interior or fare payment system on all cars affected. These are details compared with features which concern the construction of the car body.

The table of car statistics also discloses the fact that, although the car builders were far from busy during the year, an unusually large number of railways built their own cars. This condition could not have been brought about in all cases by the desire to reduce the cost of transportation from factory to railway, because in some cases the railway was located in the same town as a large car builder.

In all, five electric railway companies reported hav-

ing built during the year forty or more passenger cars each. There were also twenty companies reporting as building from one to five cars, although most of these home-built cars were service or freight cars.

Where a company attempts to build anything so elaborate as a passenger car, in our opinion it is very doubtful if any money is saved thereby. Work of this kind is sometimes planned because a company hopes thereby to keep in employment some of its repair men when work of other kinds at the shops is scarce. But even under such circumstances there is a tendency to disregard the overhead costs of the car building as well as to overbuild new shops to take care of this work.

Both Discouragement and Encouragement in the Statistics of the Year

THE statistics for 1917 on track, cars built or ordered, receiverships and foreclosures, published in the last issue of this paper, certainly do not reflect a very flourishing condition of the industry. Exclusive of electrified steam railroads and the new rapid transit lines in New York, the new electric railway track of the country reported is only about 300 miles, or less than three-quarters of 1 per cent of the total number at the beginning of the year.

An examination of the individual reports is probably even more illuminating. It shows that this new mileage is made up almost entirely of very short sections, evidently connections put in purely for operating convenience. Real extensions of lines are rare. Large industrial states, like Connecticut and Indiana, report less than 3 and 5 miles, each respectively, of new track built, while New York State during the year added only 11 miles of surface electric railway trackage.

The rolling stock table tells a like story. Briefly it is that the new rolling stock ordered during 1917 is the lowest recorded since 1907, when this paper began the compilation of its statistics. This means that 1917 had probably the lowest number of cars bought during any year since the general adoption of electricity.

The third table published last week, that of receiverships and foreclosures, was the only one of the three to show an increase.

There is no use blinking the facts. The industry is sore beset, and it would require more than a Pollyanna to become an optimist on the conditions shown by these tables. Nevertheless, there are encouraging signs, if the industry will only take heed and avail itself of them.

Of course, the principal basis for optimism and confidence in the electric railway industry is the essential nature of the service rendered. In spite of past competition of all kinds, the electric railway has remained and must remain the only means of local transportation which is available to the great majority of the people in any community. In other words, the electric railways must continue to run because the people cannot get along without them. Moreover, as the population of the country increases, the need for more and better local transportation will increase in an even greater ratio than the population. Hence the railways must not only continue to give service but must improve and extend that service as the needs of the community require.

Now, while there is nothing particularly new in this

truth, the fact remains that there is greater popular recognition of it than ever before. The attitude of the regulatory bodies as a whole is more sympathetic, as was shown during the past year by a greater willingness to grant fare increases as well as to help in other ways. The public also is understanding to a better degree the problems of the roads.

This is the proper time for the roads to take advantage of this condition. Let each explain to its public, if it has not already done so, why its cost of operation has risen and why higher fares are necessary. The public should also be told how it can help the companies in other ways to improve the car service. It is very important that the betterment of public relations should not lag just at the time when the greatest good can come from an intelligent application of its fundamental principles.

Organized Labor Should Not Profiteer

FAITH in the union-labor movement, which has been fostered during recent months under the sane leadership of President Gompers, is due for a setback in the public mind through such actions as the attempt to force wage increases on companies whose old contracts have not expired. In Cleveland and in Toledo efforts are being made to advance the interests of the employees through unfair pressure, notwithstanding the fact that written agreements as to wages and working conditions are still in force. Organized labor has been strong in its condemnation of war profiteering on the part of capital. A fair-minded public must put into the same classification such a movement on the part of trainmen who would take advantage of war conditions to promote their own welfare to the serious detriment of the utility which is affected.

Even in those cases where the wage scale fixed by agreement a year or two ago does not meet the present cost of living, labor leaders must remember that their employers have also to contend against the increased cost of materials and diminishing receipts. Voluntary raises in pay have been given by many companies to the extent that they can stand the extra burden. Other companies will have to take their chances with boards of arbitration when the present contracts expire. But to stir up public feeling by threats of strike or appeals to the federal government to compel a change in the agreement, is an act which should brand the agitators as poor sportsmen, and should not win for their appeal a popular indorsement.

Another view was taken in Chicago some months ago where unionism, under patriotic leadership, negotiated an agreement which showed a proper recognition of the exigencies of war times. In accepting a wage scale which was a compromise, the union employees bound themselves for a three-year period, and pledged themselves to do all they could to promote mutual interests, "keenly recognizing and appreciating the situation now confronting our government." This is the spirit which should govern all employees who are bound by contracts for a definite period. They should bury their cupidity and prejudices and bide their time. Better still, let their organization help to gain a flexible fare for their employers, and thus provide a basis which will meet fluctuating costs.

Rehabilitating the Power System

THE coal and labor shortage has forced into the limelight some unwelcome facts regarding power generation. Many power plants are using too much coal for their output. Even in peace times the older plants, many of them far from worn out, were being relegated to the scrap pile. The present conditions will hasten their progress in that direction.

A pound of good steam coal contains 12,000 B.t.u. more or less, that is, enough heat to raise 12,000 lb. of water 1 deg. Fahr. Converted entirely into electrical energy this would be almost exactly $3\frac{1}{2}$ kw-hr. In other words, *except for conversion losses a kilowatt-hour of energy could be produced from less than a third of a pound of good coal!* Some plants consume fifteen times, and the best of them burn nearly five times, this amount.

Unfortunately, unless new methods of transforming the chemical energy of coal into mechanical energy are discovered we must put up with a loss of at least 75 per cent in the chimney, the boiler, the engine or turbine, the condenser, the piping, the generator and the auxiliaries.

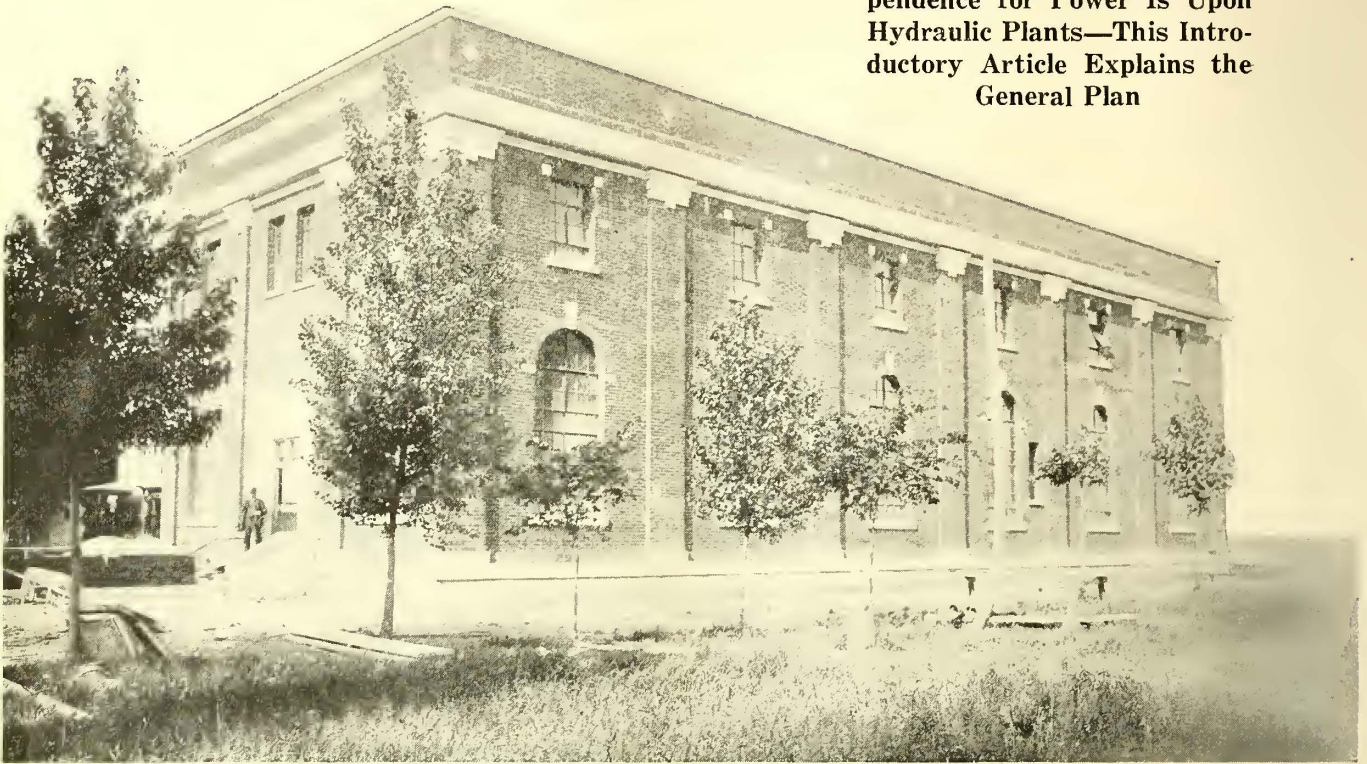
The situation outlined above explains the general rehabilitation of power plants, substations and transmission lines which is general in this country, Canada and elsewhere. These pages have contained many examples of the process.

This week we begin a series of three articles on the very interesting and typical work which is going on in Montreal, and which is as nearly completed as such a mutable thing as a power system can ever be said to be. In studying this account the reader must remember that it is a remodeling that is pictured, not the building of a new system from the ground up. Hence existing equipment has been repaired where it is cheaper to keep it than to throw it out. Of two steam plants still retained, one will seldom be used except as a substation. The other will be operated only on peak loads and as an emergency reserve. The surrounding abundant water power will be used to the limit as it should be. The redesign of the main steam plant, however, has received scrupulous attention, so that when it is running it will give the best possible account of itself. The distributing lines and substations are also being brought strictly up to date.

A feature of this remodeling at Montreal which illustrates the importance of standardization is the provision for shifting substation equipment from one part of the distribution system to another as needed. A company may have a transformer and converting equipment of aggregate capacity sufficient for its needs, but if this is not properly distributed there will be overloading at some points and underloading at others. One condition involves excessive energy loss, deterioration of apparatus and poor voltage regulation; the other is accompanied by operating inefficiency. Ability to move a unit as required will obviate this unbalancing. It might be argued that power needs can be anticipated if the growth characteristics of a community are properly understood, but the fallacy of this argument is proved by experience. It is best to be prepared for the unexpected. Mobility of equipment can well be considered as a factor of such preparation.

Electric Railway Power at Montreal

Montreal Tramways Is Completing Program of Power Generation and Distribution Rehabilitation—Principal Dependence for Power Is Upon Hydraulic Plants—This Introductory Article Explains the General Plan



FRONT AND EAST SIDES OF POINTE AUX TREMBLES SUBSTATION,
MONTREAL TRAMWAYS

THE power generation and distribution system of the Montreal (Quebec) Tramways is unusually worthy of study at this time because a train of circumstances has brought about a fairly complete remodeling of the main power plants, the substation layout and the transmission and distribution lines. Ever since the three original electric railway lines in the city were developed, about 1892, there has been a struggle to keep the power supply abreast of the expansion of the railway system, which has coincided with that of the city. In recent years the growth of the city has been very rapid until now the population is in the neighborhood of 800,000. In addition to the city itself the Tramways supplies transportation to Westmount, Outremont, Verdun, Maisonneuve and Mount Royal, which form an integral part of the community. The Tramways now has more than 260 miles of track and more than 1000 cars in service.

The principal source of power for the Tramways has been the water power, in which the neighborhood abounds. Upward of 500,000 hp. is developed within easy reach of Montreal, so that steam power is required by the Tramways only for reserve and to control the peaks of the load, thus limiting the service charge for power. Two steam plants are in operation, the old William Street station, now used practically entirely as a substation, and the more modern Hochelaga plant, which is the principal steam reserve. The Hochelaga plant is in course of remodeling, the details of which process will be covered in a later article.

Power from the hydraulic plants is transformed in several substations containing motor-generator sets. One of these, the St. Denis substation, has been entirely remodeled this year, and a new substation at Pointe aux Trembles is now receiving the finishing touches. One motor-generator set is in operation here and a second is about ready to be started up. In the early days, before the local hydraulic development had progressed very far, steam power was depended upon very largely for the Tramways' supply, but for nearly twenty years an increasing proportion of water power has been utilized. Of late years the tendency seems to have been to keep the steam power about 20 per cent of the total, and generating equipment has been added from time to time to maintain this average.

FACTS PRECEDENT TO PRESENT POWER SITUATION

Going back to the year 1900 we find that the first contract for water power was with the Montreal Light, Heat & Power Company for 5000 hp. delivered at the William Street power house. By this time the Tramways was approaching the limit of the steam capacity, the output being about 13,000 hp., as compared with a possible output of 17,000 hp.

In an article published in the *STREET RAILWAY JOURNAL* for June 6, 1903, page 833, Ralph D. Mershon, consulting engineer to the company, described the equipment which had been installed to receive and transform the hydraulically produced power, the equipment being for the time rather unique. The power was received

in the form of quarter-phase current at 66 cycles and 2200 volts over seven circuits. Six induction motor-generator sets and one synchronous motor-generator set were installed, of a combined rating of 5000 hp. continuous output, and a relay capacity of 15 per cent more than this. When installed these sets, which are still in operation, were said to be among the largest built up to that time, although individually not the largest. The total capacity, however, was probably larger than that of any group of induction motors in the world assembled under one roof.

One of the most novel features of the installation was provision for pumping power back into the line when needed, using the direct-current machine as a motor and the induction machine as a generator. This was probably the first commercial use of the induction generator, although the regenerating ability of the induction machine when supplied with polyphase exciting current was known long before.

In choosing motor-generator sets rather than rotary converters for the William Street substation the engineers had the following considerations in mind: First it was desirable to have machines that could be operated with the minimum of care, attention and skill. The induction motor had been highly developed and the rotary converter had not by any means attained the perfection which has since been achieved. In the second place it was desired to interfere as little as possible with operating conditions on the power company's transmission system, and it was felt that induction motors, brought up to speed from the direct-current end of the sets, would meet the requirements in this particular. Moreover, started in this way, the motors could be built with practically no resistance in the squirrel-cage secondaries and hence with excellent speed-regulating qualities.

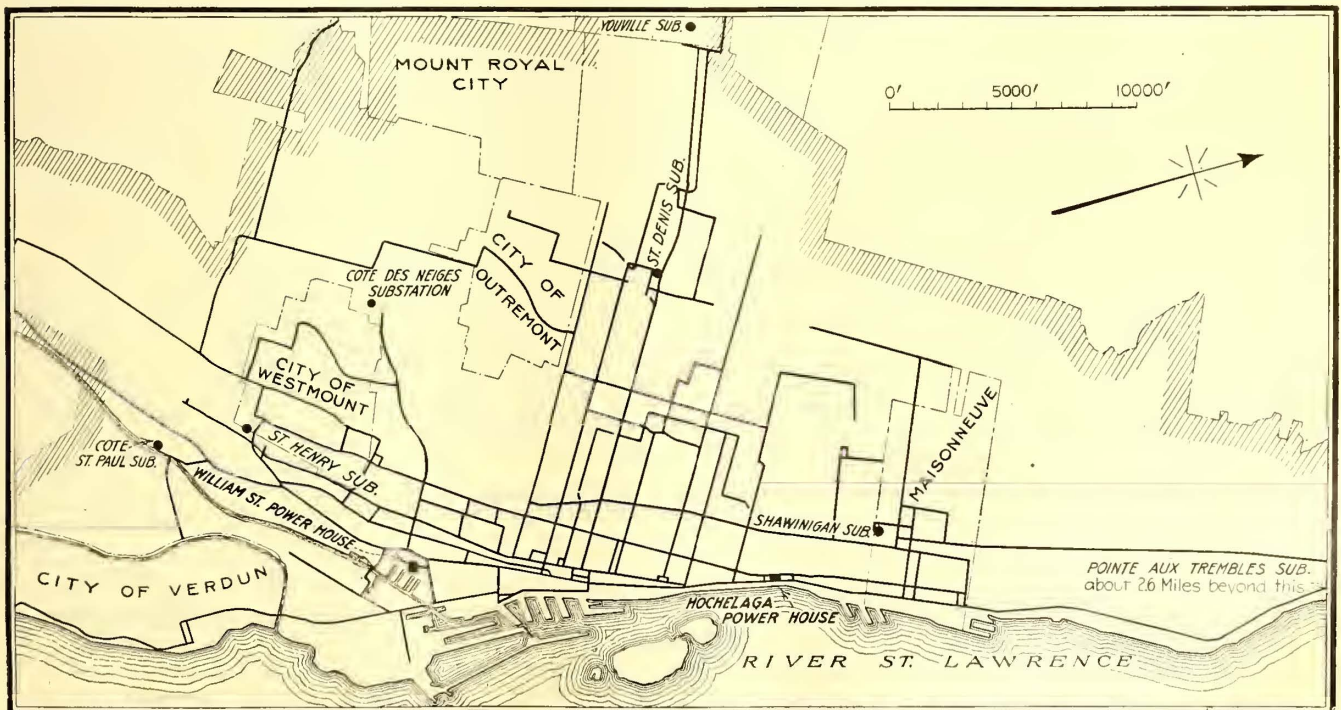
The next increase in power supply came about through a contract made with the Shawinigan Water & Power Company for 3000 hp. delivered at a local substation of the Shawinigan Company. This is in the Hochelaga

ward of the city, a section in which the demand for power was rapidly increasing. Also at this time a contract was made with the Montreal Light, Heat & Power Company for 4000 hp., and to utilize this power two 1000-hp. motor-generator substations were built, one on Glen Avenue near St. James Street, opposite the St. Henry carhouses, and the second on Bellechasse Street, west of St. Denis Street. The railway company spent about \$500,000 on this expansion. The contract still stands with respect to power furnished through the St. Henry and St. Denis substations, the latter of which has just been entirely rebuilt, and the last 2000 hp. taken from the Montreal Light, Heat & Power Company on above contract.

At present 12,000 hp. of hydraulic power is being taken under the Montreal Light, Heat & Power Company and Shawinigan Water & Power Company contracts. This is purchased at the rate of \$25 per horsepower-year for the hydraulic power, with \$4 for conversion on the 3000 hp. taken from Shawinigan only. The rate is based on a 70 per cent load factor.

Soon after the provision for distributing Shawinigan power in the eastern section of the city had been completed, the company felt the need for a steam reserve in this section, and in 1906 a standby station along then-approved lines was built. This contained two 1000-kw. and one 2000-kw. marine type compound McIntosh & Seymour engines driving direct-current generators. A few years later this equipment was supplemented with a 2000-kw. alternating-current turbo-generator unit with a large rotary converter. This was put in as a temporary expedient to provide greatly needed additional reserve, and the equipment was selected because it provided a more economical generating unit than the older machines. The turbine, the rotary and the engines are still in use. The station as a whole, however, is being entirely remodeled.

A new source of water power was utilized in 1912 when the Tramways company began to buy hydraulic power through the Montreal Public Service Corpora-



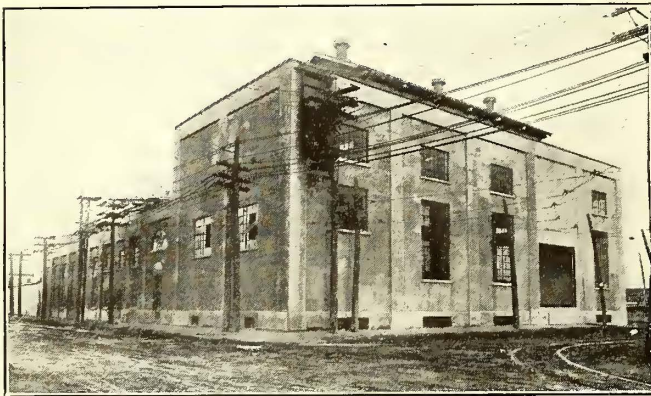
SKETCH MAP OF MONTREAL, QUEBEC, SHOWING LOCATION OF ELECTRIC RAILWAY LINES, POWER PLANTS AND SUBSTATIONS

tion, additional substations being installed from time to time. The corporation is the distributing company for the Canadian Light & Power Company. The latter is a subsidiary of the Montreal Tramways & Power Company, of which the Tramways company is also a subsidiary.

The corporation furnishes power on a meter basis in three-phase form at 13,200 volts to a total of 10,000 hp. Of this 4000 hp. is delivered at the old William Street plant, where two 1500-kw. synchronous motor-generator sets serve to convert it into direct-current form.

THE 1916-1917 REHABILITATION

With this outline of the development of the power situation in Montreal in mind it is possible to appreciate the circumstances leading up to the present rehabilitation. It has been seen that the company made



SOUTHEAST VIEW OF ST. DENIS SUBSTATION,
MONTREAL TRAMWAYS

arrangements for power supply in different sections of the city to the best possible advantage for the time being, but with a growing need for a unification of the whole system, last year the Tramways company began the execution of a comprehensive plan for the purpose.

The decision to overhaul the distribution system at this time was brought about by a number of causes. In the first place on account of the limited number of distribution points it was difficult to distribute power at the low direct-current voltage of 600 without excessive loss. In connection with this was the insecurity of the power supply at any point, as it was difficult for one part of the system to help out another.

Another factor in the matter was the necessity for putting the feeders and transmission line underground. This was not only in accord with the trend of the times in large cities, but the movement was accelerated by act of legislature. Obviously in placing the circuits underground it would be most economical to use high voltage wherever possible.

It was therefore decided first to increase the number of distribution points by adding substations; second, to install a comprehensive high-voltage alternating-current transmission system, and third, to interconnect the substations so that power will be available at any part of the system.

Investigation showed that the instantaneous power demand as a whole on all of the power houses and substations of the company, prior to the amplification of the system, was less than 80 per cent of the sum of the individual instantaneous demands. In view of the

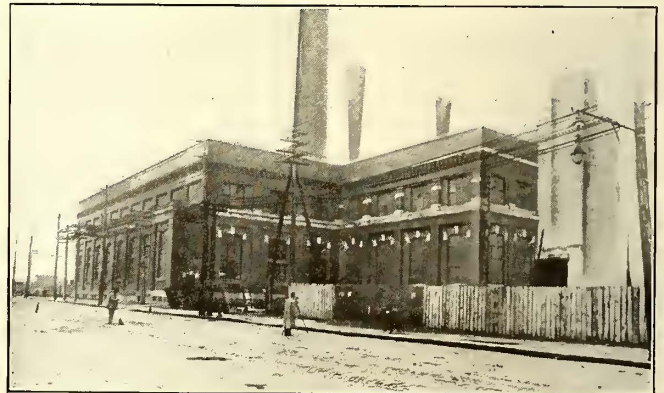
large extent to which power is purchased it is evident that a very considerable saving would be brought about by tying the whole system together. This saving, capitalized, would provide for a very considerable investment in underground cables and still leave a margin of profit. A further saving was possible through the use of more centralized energy generation operated according to modern scientific methods.

As a logical part of the development it became necessary to introduce large alternating-current generating units in place of the direct current units in use. By means of the interconnected system the power generated by these units would then be available at any point when needed to supplement the hydraulic power.

IMPROVEMENTS AT HOCHELAGA

In improving its power generating facilities the company naturally selected the Hochelaga power plant as the logical one for improvement because it is located conveniently with respect to water and to land for the storage of coal. In looking to the future it was considered desirable to plan for the possible ultimate installation of four turbo-generator units of 15,630-kva. capacity each. One of these has been installed and a second is on order for delivery in April, 1918. The completion of the plans will involve the abandoning of the three vertical units and the 2000-hp. steam turbine now in place. However, two turbines will take care of the requirements for some time to come and the vertical units will be retained for the time being.

The installation of the turbine units made an increase in boiler capacity necessary, and four 1100-hp. B. & W. marine type boilers, with superheaters and



SOUTHEAST VIEW OF HOCHELAGA REMODELED POWER HOUSE,
MONTREAL TRAMWAYS

economizers, were added. These were provided with ejector draft fans, motor-driven. The boiler house was further modernized by the addition of such devices as steam flow meters and draft gages, by the elaboration of the coal-handling system, etc. Under way also are changes in the old boiler furnaces for the purpose of increasing the boiler outputs. Taylor stokers with independent draft fans will replace the chain grates previously used.

Even more important than the changes in the power plant have been those in substations and the distributing system. The St. Denis substation has been revamped at a cost of nearly \$225,000, and a beautiful substation has been built at Pointe aux Trembles. The latter is designed as a model for future development,

Effects of War Conditions on Cost and Quality of Public Utility Service

Extra Operating Expense of \$116,500,000 per Year Should Be Considered by Commissions in Modifying Rates for Electric Service

THE effects of war conditions on public utilities are explained in considerable detail in a paper by Lynn S. Goodman and William B. Jackson presented before the American Institute of Electrical Engineers at New York on Jan. 11. This paper deals particularly with the effects upon electric light and power business, but the same general principles are also applicable to electric railway service. These effects are placed under two general heads, namely, those manifest in the heavy increases in operating cost and those causing the extraordinary increases in cost for new plant required to care for added business.

During the past years individual salaries and wages have been gradually increasing, while the labor cost per unit of service has been decreasing. War conditions, however, have greatly affected this situation, and the growing scarcity of labor in the ordinary occupations of peace tends to increase wage and salary scales. Employment of women has placed an additional class of labor at the service of the electric utilities, but more women employees are required than the number of men replaced, and war conditions tend to exhaust even this class of labor by offering wider fields of employment.

An analysis of the United States Census statistics shows that the increase in the average wages per employee, not including general officers, managers and superintendents, during the ten years from 1902 to 1912 was 11 per cent. Since the beginning of the war salaries of officers, managers and general superintendents have not greatly increased, but the wages in the oper-

ating departments have increased from 15 to 50 per cent, and it is estimated that 25 per cent may be taken as the average increase thus far occasioned by the war. The total salaries and wages paid to employees of electric companies throughout the United States make up about one-third of the total operating expense. With normal growth from 1912, at the rate indicated by the growth during the previous ten years, the salary and wage disbursements of electric companies for the year 1917 would have amounted to \$90,000,000, of which one-seventh would have been for general officers, managers and superintendents' salaries and six-sevenths for wages. The increase in wages of 25 per cent, therefore, means an outlay on the part of electric companies of \$19,000,000 for the year.

INCREASE IN THE COST OF FUEL

Estimates based upon the United States Census reports show that the cost of fuel has an extremely important bearing upon the total cost of electric service. This item of expense for all the electric companies in the United States would have reached \$50,000,000 for the year 1917 under normal conditions and would have amounted to about 60 to 65 per cent of the normal generating expense. On the average, the cost per ton of coal to electric companies has increased a little more than 100 per cent on account of war conditions, making the increase of total cost due to the increased price per ton of fuel \$50,000,000. A conservative figure for the increase in tonnage due to lower quality and non-uniformity of grade is estimated at 10 per cent, which means an added increase of \$10,000,000, making the total increase \$60,000,000.

The output which might have been expected for 1917 under normal conditions for steam-driven electric stations is 13,000,000 kw.-hr., and an average requirement of 3 lb. of coal per kilowatt-hour of output shows that the fuel requirements would amount to not more than 20,000,000 net tons. This is approximately 3 per cent of the estimated output from the mines for 1917. Thus a relatively large reserve supply of coal in the hands of every electric company would tie up but a very small part of the coal supply of the country and this supply would be widely distributed over the country, and to a certain extent would be in proportion to the population and industrial importance of the several sections of the country.

The normal cost of materials and supplies other than fuel used in operation and current maintenance of electric properties makes up probably a little more than 15 per cent of the total annual operating expense. The increase in the cost of such materials and supplies due to war conditions have been as much as 75 per cent. Such an increase in this expense means an increase in expenditures in the neighborhood of \$30,000,000 over normal expense for 1917.

(Concluded from Page 74)

both with respect to architectural arrangement and machinery and control layout. In a large part of the territory the high-tension lines have been put underground in the company's own conduits in accordance with a standard plan. The low-tension cables are being drawn into the municipal conduits. The substations will be made the subject of a separate article, but their general appearance is shown in the accompanying photographs. All of the substations are being tied in with the Hochelaga power plant on a ring system, so that the reserve steam power can be promptly supplied at any point where it may be needed.

In the substations the plan is to use larger units than formerly, eventually practically standardizing on 1500 or 2000 kw. as the size. Previous to 1912 the tendency was toward units of about 500 kw. In remodeling the buildings the engineers have given special attention to improvements in lighting and ventilating conditions, with a result that delightful surroundings are provided. By the use of fireproof construction everywhere the fire insurance premiums have been reduced to a minimum.

Measures which include the development and maintenance of protective structures and lighting systems, as well as special policing, must be taken to protect properties from interference by enemy agents. The government action in restricting the activities of the alien enemy population is an important safeguard, but the necessity for direct protective measures adds hundreds of thousands of dollars to the normal expense account of individual large electric corporations and amounts to at least \$2,000,000 or \$3,000,000 in the total cost of service throughout the country.

INCREASE FROM TAX ON NET INCOME

According to the United States Census returns, the 1917 taxes paid by electric companies might normally have reached \$25,000,000. The proportion of gross revenue required for taxes has been increasing year by year, having been slightly more than 3 per cent in 1902, a little more than 3½ per cent in 1907 and nearly 4½ per cent in 1912. Taxes on net income made up a very small proportion of the total tax in former years, but this form of income taxation has had growing favor in legislative circles. An estimate of the amount of the expense which may be expected to be added to the cost of electric service throughout the country by the operation of the net income tax law will lie between \$5,000,000 and \$10,000,000 for the year 1917.

The extra expense now imposed on electric companies on account of war conditions, as shown by the foregoing amounts, equals the immense aggregate of \$116,500,000 per year. This is a quarter of the normal estimated gross revenue for 1917 of all the electric companies, and it wipes out two-thirds of the sum that would have been available for return and surplus.

In addition to the above expenses there are the additional expenses caused by the difficulty of retaining trained operators, the cost of protecting properties against malicious interference and the possible decrease of consumption of electric power, the magnitude of which it is impossible to estimate.

EXTRAORDINARY INCREASE IN COST OF NEW PLANT

The effect of war conditions in the matter of extraordinary increases of cost for new plant required to care for added business appears in several forms. The increased cost of new plant per unit of capacity manifestly affects the cost of service not only for the period of the war, but for the life of such plant. Many electric companies are now confronted with the necessity of caring for large demands for power arising from the increasing expansion in the manufacture of material for war purposes.

The economical power generating station is the proper medium for the supply of large power requirements arising on account of the war. The purchase of power leaves the manufacturers of munitions and other war materials free to devote their energy to the development and operation of the manufacturing plants without diverting any of their energy to the development of power plants or their operation. These advantages are so great that it is advisable that the government should use every reasonable means to encourage the power companies.

Extension of the totals shown in the United States Census of central stations for past years to the year

1917 show that under normal growth the total revenues in 1917 would have reached \$475,000,000 and the operating expenses \$290,000,000, making a total income of \$185,000,000. Estimating the cost of construction and equipment at \$3,500,000,000, the income would represent 5.3 per cent of this cost of construction and equipment. If no other factors entered into the problem besides increases in cost of operation, the fuel expense would have increased \$60,000,000 for 1917, other supplies \$30,000,000, labor expense \$19,000,000 and taxes \$7,500,000, representing an aggregate increase of operating expenses for these items of \$116,500,000. This is an increase of 40 per cent in operating expenses, and it reduces the divisible income to \$68,500,000, which amount is equivalent to less than 2 per cent on the cost of construction and equipment.

Current expense accounts may be reduced by postponement of planned repairs which would normally be made at once, but it is well to recognize that the longer repairs are put off the more they cost. While current expenses may for a time be lower, the cost in the long run will doubtless be increased. The net results of such economies might amount to as much as 10 to 15 per cent of the normal operating revenue of the electric companies, but they are offset by increases in expense which have not been included in the amounts named, such as expenses for obtaining new employees, the lowered efficiency of such employees, special policing, etc.

DECREASE IN CONSUMPTION OF ELECTRIC POWER

Principal consideration has been given to the effect of war conditions as increasing the demands for service. In England the danger from air raids and the necessity for conserving coal have materially decreased, and in some cases almost wiped out, the street lighting service furnished by many companies, and the domestic and commercial lighting loads have been very materially reduced. There has, however, been quite a universal increase in rates, in some cases flat percentage increases of the same amount for light and power, in other cases differing percentage increases for light and power, and in still others increases depending upon changes in cost of fuel. The flat percentage increases have varied from less than 10 per cent to as high as 50 per cent over the rates in effect prior to the war, London rates having been increased 50 per cent.

From the foregoing it is evident that increased expense for service arises in every department of the business, in operating labor and supplies and taxes, in protection of the property, and in cost for extensions of plant. The latter is affected not only by abnormal first cost for equipment and its installation, but also by the present difficulty in obtaining money for such purposes at other than exorbitant rates as compared with normal. The increases of cost of electric service on account of war conditions are so great that rates for service which were equitable at the beginning of the war are in some cases now not covering the operating expense. Where companies are being loaded with war business, the new business in many cases may become a serious menace to the company, which can only be overcome by taking into account the war conditions in determining the rates to be charged. It seems proper that regulatory bodies should take into account these considerations in their requirements for electric service during the war.

Zone System Approved for Holyoke Company

Massachusetts Commission Decides That Zone System with Central Five-Cent Area Is Best Suited to Local Situation—Decision Not a Binding Precedent for Other Cases, but Commission Says Such Zone Plan Should Have Fair Trial—Experience with Six-Cent Fare on City Lines Not Especially Encouraging So Far

THE so-called zone system which permits city electric railways to raise their fares without increasing the 5-cent rate in the central district should receive a fair trial—this is the point of the fare decision just made by the Massachusetts Public Service Commission in the Holyoke Street Railway case. Without establishing any precedent which must be followed in other cases, the commission holds that such a zone system is well adapted to the Holyoke situation and is likely to produce the most satisfactory results for all concerned. In its opinion, the experience thus far in Massachusetts with a 6-cent unit of fare for city lines has not been especially encouraging.

The Holyoke Street Railway had asked the commission to select the method, from among several suggested, by which the road could obtain more revenue. No new schedule of rates was filed, but it was proposed to establish a zone system, increase rates, or do both. The commission's decision now authorizes the general zone plan proposed by the company, with a few modifications in details. Complete relief, it is said, should not be expected in these war times.

According to evidence submitted to the commission, the company operates about 72 miles of track, the lines in general radiating from the City Hall in Holyoke to Springfield, Northampton and other towns. The population of the territory served increased from 60,374 in 1890 to 104,296 in 1915. Between Springfield, Holyoke and Northampton the company is in competition with the Boston & Maine Railroad, upon which fares at lower than the normal rate are charged because of the competition. The permanent investment per mile of main track in 1916 was \$44,914.

The old fare unit was 5 cents, except on the Amherst and Sunderland division, where it was 6 cents. No workingmen's or other reduced rate tickets were sold except the legally required half-fare tickets for school children. Few changes in fares had been made since the beginning of electric operation. The distance which

might be traveled for 5 cents was comparatively long in certain cases, ranging from 7.26 to 10.06 miles in twelve instances. Possible rides of more than 6 miles were frequent.

Until recently, the road had been one of the best paying in Massachusetts. From 1892 to 1915 it paid regular dividends of 8 per cent. In the fiscal year 1916 it paid 6 per cent, and in the succeeding year, 4½ per cent. In all but five years these dividends appear to have been fully earned, and only slight drafts upon surplus were made. Since much of the stock was

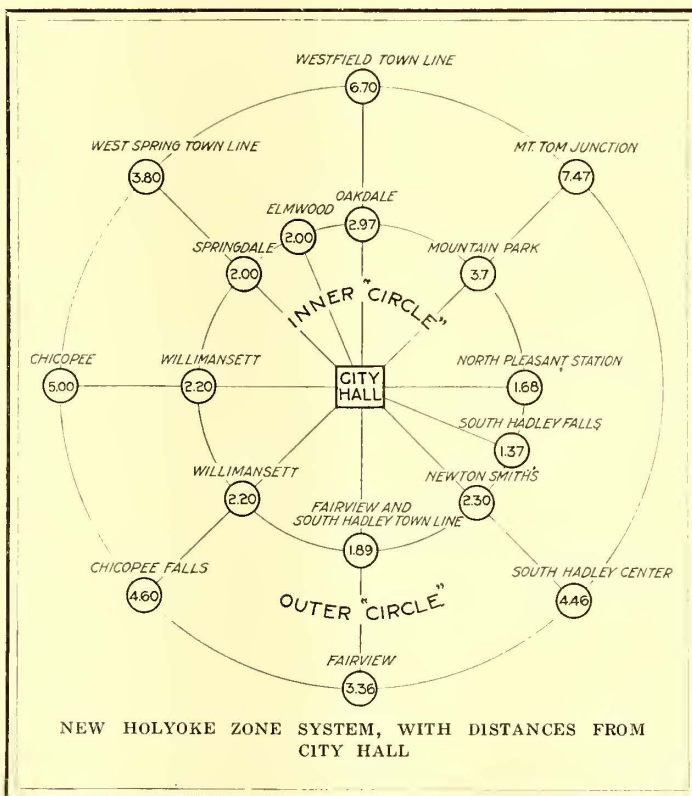
issued at a premium, the actual return was less than the rate of dividend. From 1908 to 1917 inclusive the percentage earned on the investment ranged from 4.32 to 8.60; the investment from \$1,938,334 to \$2,953,017, and the income from \$119,719 to \$155,675. The total permanent assets on June 30, 1917, were \$3,051,478. The operating revenue in 1917 was \$711,374, and operating expenses \$537,170.

The inspection department of the commission found that the track and roadbed had been well maintained and are now in fair condition. During the next five years, it is estimated, about 20 miles of track should be relaid and about 95,000 ties renewed, at a total

cost of about \$244,000. In addition, about \$144,000 should be expended for renewals and repairs of special work, overhead system, telephones and signals.

The company has 139 passenger cars, average age fifteen years. Thirteen of the sixty-six closed cars are of the semi-convertible type. Eight were purchased in 1916, and five in 1913. None of the other cars are really modern. Many car replacements should be made in the near future. The single-truck cars have for the most part outlived their usefulness. In this matter the commission's finding says:

"It is desirable that the company should gradually abandon the larger part of its present equipment and substitute semi-convertible cars which can be used the year around. While the management feels that the



open cars attract traffic during the summer months, properly designed semi-convertible equipment is in some respects more attractive, and the present double equipment unquestionably adds materially to expense of operation. On certain lines one-man cars can probably be used to advantage."

Out of 384 motors, 186 are of good type and 130 are less efficient but still serviceable. The remainder, in the opinion of the inspection department of the commission, are unprofitable to operate and should be sold before junk values recede. In 1914 the company constructed, at a cost of about \$225,000, a modern carhouse, shop and office building in Holyoke. The department reports it to be one of the best of its kind in the State. It has decreased maintenance, car storage and inspection costs. The department, however, believes that better results can be secured if the mileage per car per day is furnished to the master mechanic and inspections made on this basis. About \$250,000 was expended in power plant improvements in 1914, and the plant is now in good condition and reasonably efficient. The voltage throughout the system is reasonably good except on the Westfield line, where new feeders are needed. The company, it is said, has always been regarded as well managed and furnishing good service.

RISING COSTS AND DEPRECIATION REQUIRE INCREASED EARNINGS

In support of its petition for increased revenue, the company held (1) that in the year ended June 30, 1917, it did not feel the full effect of prevailing high prices of coal, steel, copper and supplies in general, and these prices will materially increase the cost of operation for some time to come and, in conjunction with certain other factors, decrease net income; and (2) that the company did not in this year make sufficient provision for depreciation.

The coal now being used costs \$8.45 per ton delivered, and the increased price for 1918 consumption is expected to total \$21,500. Early in 1916 the company anticipated the rise in the material market and purchased a comparatively large stock. The management estimates that if current prices had been paid for materials used in repairs and renewals in 1917, the cost would have been about \$13,000 greater.

The commission feels that there is little reason to anticipate lower prices until some time after the war, and it says: "The company may reasonably expect in the immediate future, in our judgment, an increase in operating expenses, as compared with the year ended June 30, 1917, of at least \$35,000 per year and probably a greater sum, owing to increased prices of fuel and other supplies without allowing for any greater use."

Expert testimony was introduced by the company to prove that greater provision for depreciation should be made, the lives of the various classes of property being estimated as follows: Rolling stock and equipment, twenty years; track and electric line construction, sixteen and two-thirds years; buildings, thirty-three and one-third years; power plant and equipment, twenty-five years; park property, excluding land, twenty years. The composite life of all depreciable property was twenty-one and three-quarters years. From these life estimates the amount which ought to have been expended or set aside in 1916 was determined, the total

being \$144,501. The maintenance expenditures were then analyzed to ascertain the portion used for renewals which might properly have been charged against a depreciation reserve, and the unprovided-for depreciation was found to be about \$100,000.

The commission in its finding agrees that insufficient depreciation has been set aside, noting as an example the need of new cars to replace those which, while not worn out, are not efficient according to modern standards. Old power plants outside Holyoke have not been adequately charged off. No depreciation account exists to cover certain track and line renewals now overdue. The commission points out that while changes in the art may at any time upset life calculations, estimates must be made, for depreciation is certain and ought to be systematically provided for. It has been urged by certain experts that no depreciation reserve is necessary in the case of a large electric railway which has been gradually built up, since renewals tend to strike a yearly average if made regularly and seasonably. This, the commission concedes, may be true on a large system, but not on a property the size of that in Holyoke. In any case, life calculations are an important check upon yearly expenditures.

The commission is inclined to believe the property lives assigned by the company low, but it concludes that \$100,000 per year is needed to put the property into first-class shape within the next five years, besides at least \$35,000 per year, or probably double that amount, for increased operating expenses and at least \$50,000 per year for current depreciation. With necessary rehabilitation included, from \$185,000 to \$220,000 per year will be required.

MAXIMUM RETURN NOT TO BE EXPECTED IN WAR TIME

The commission is of the opinion that while the stockholders have already been called upon for a sacrifice of a reasonable return and ought, in justice, to be able to look forward to a day in the not remote future when dividends will be restored to the normal rate, they ought not to expect for the present a rate higher than 6 per cent. This would mean substantially less than 6 per cent on the entire investment. In determining what action is now just and reasonable, the commission gives weight to the following points:

1. The burden of high prices from which the company is suffering is caused by the war, which is falling with equal weight upon most individuals in the community. It is not a time when maximum returns ought reasonably to be expected.

2. Present prices of fuel and materials are clearly abnormal, and it ought not to be assumed that they will continue indefinitely. It is reasonable to suppose that relief will come soon after the war ends, and it is possible that it may come sooner through governmental regulation. So long as these excessive prices continue, it would be unwise to establish a scale of fares for the purpose of making a provision now for past and future depreciation which is theoretically sound but far in excess of any provision which this company and electric railways generally have been making in the past.

3. Under present abnormal conditions it is doubtful whether any extensive process of rehabilitation could be or ought to be undertaken. Even if funds could be obtained, the necessary construction materials and equipment could be secured, if at all, with great difficulty and only at excessive prices.

4. While the rehabilitation suggested is desirable, the property is in sufficiently good condition to furnish service of fair quality without it.

Under the conditions, therefore, it appears to the commission that it would be just at present to establish a new scale of fares estimated to produce about \$110,000 in additional yearly revenue. If this were obtained, though as a rule it is the experience of electric railways that the actual results from fare increases fall below previous estimates, it would enable the company, unless conditions change for the worse, to meet increased expenses, pay moderate dividends and make a substantial provision for depreciation.

"No one," says the finding, "can accurately foretell the results which may come from any advance in rates, and electric railway managers themselves are in doubt as to the best method of increasing revenue. Several methods are now on trial in the Commonwealth. The future course of prices, of wages and of traffic are just as uncertain, and it is also possible that new legislation during the year may modify the situation.

"Furthermore, an engineering and operating survey of the property is very desirable and ought to be made by the company. This should furnish full information as to the ages of all important items of existing property; renewals provided for in recent years from the maintenance account; economies likely to result from changes in rolling stock, track, line and shops; methods of track construction; use of power by motormen; routing of cars; layovers, and development of trolley freight and express service, in which last the company has made little progress."

METHODS PROPOSED FOR INCREASING REVENUES

Three methods of increasing fares were suggested by the company. Two were similar, based upon an application of the so-called "zone system." They preserved the 5-cent fare within the thickly-settled part of Holyoke, but reduced the distance which might be travelled, thus creating an outer zone to and from which an extra fare would be charged. The third method was based upon the substitution of a 6-cent fare and a 2-cent transfer charge for the present 5-cent fare. All three provided for a 7-cent fare on the Amherst and Sunderland division instead of the 6-cent rate existing at the present time.

Under the first zone plan the inner circle would include the thickly-settled portion of Holyoke and also the villages of South Hadley Falls and Willimansett. In no case would the limit of the inner circle be placed at a point within the congested territory unless the line terminated within that area. The zones and distances from the Holyoke City Hall are shown in the accompanying diagram. Under this plan it was proposed to charge 5 cents between all points within the inner circle and 5 cents between points in the outer circle located on the same line; 10 cents between any point in the inner circle and any point in the outer circle, and 15 cents between points in the outer circle located on different lines. Tickets would be sold at the rate of four for 30 cents, good between South Hadley Center, Fairview, Chicopee Street, Chicopee Falls or West Springfield town line and the Holyoke City Hall. A charge of 1 cent would be made for each transfer, but this penny would be redeemed if the transfer were presented within the indicated time limit. No transfers would be issued in connection with the 7½-cent tickets.

The second zone plan provided for the same inner and outer circles, but a somewhat different system of

charging. Instead of providing for the sale of 7½-cent tickets, good between the City Hall and the points above mentioned, it substituted a 7-cent cash fare, with transfer privileges at the City Hall, except that no transfers would be given from the South Hadley Center, Chicopee, Chicopee Falls or West Springfield routes to or from Mountain Park. In all cases, both for through routes and for rides within the inner circle, 1 cent would be charged for transfers, without redemption. Between Fairview and Chicopee Street, or Chicopee Falls, special tickets would be sold, making the fare 10 instead of 15 cents. The first zone plan was estimated to yield \$145,000 additional revenue a year; the second, \$132,000, and the 6-cent unit fare alone, \$140,000.

COMMISSION FAVORS ZONE SYSTEM FOR HOLYOKE

At the hearings the company expressed a preference for a zone system with a 5-cent unit in the thickly settled district. The communities in general favored a 6-cent unit without change in fare limits. In reaching a decision, however, the commission was guided by its best judgment as to the plan which, taken as a whole, would produce the best results for all concerned. It is difficult, the commission says, to gage public sentiment accurately in advance of actual trial.

It is the commission's belief that experience so far in Massachusetts with a 6-cent unit on city lines has not been especially encouraging. It is an awkward fare, hard to collect, either with the old register system or with the prepayment fare box. In the latter case it lends itself readily to fraud. It has a further and perhaps more serious disadvantage in that it discourages short-haul riding and encourages jitney competition. There is, the commission states, an undercurrent of feeling in electric railway circles in favor of maintaining a maximum fare of 5 cents in compact metropolitan centers. Short-haul riding is the most profitable, and the best minds in the industry are now at work on the problem of attracting and holding this kind of traffic.

The point is well illustrated in the present case. In a city like Holyoke, where a number of lines radiate from a common center, the opportunities for securing short-haul traffic are at a maximum. For example, in the case of the lines which extend to Elmwood, North Pleasant Street and South Hadley Falls, none is more than 2 miles long, and in one case the distance is less than 1½ miles. A 6-cent fare on such lines would, in all probability, lead many present riders to walk and would thus open up an inviting field for jitney competition at the 5-cent rate. It is on such short city routes that jitney operations have proved most profitable. On the other hand, if a 5-cent fare can be preserved on such lines and a regular and a frequent service provided, present service being doubled by the introduction of one-man cars if necessary, opportunities for attracting traffic are great.

To the commission's mind there is equity also in keeping the 5-cent unit within the congested district, for it is this which gives strength to the system. Over two-thirds of the people served live in Holyoke and the adjacent settlements across the Connecticut River, and they have really furnished the prosperity which the company has enjoyed in the past. It has been urged on grounds of social welfare that the zone system ought not to be introduced, because it will further congest the central

district and prevent families from living in more comfortable surroundings in the suburban territory. Certain observers, however, are of the opinion that the benefit of a low fare in suburban territory is received by the landowner rather than by the tenant. In other words, where a low fare exists, land values and rents increase, while, if the fare is high, they remain at a low level. The net result, as far as the cost of maintaining a home is concerned, is much the same in either case, in the view of these observers, the difference being absorbed by real estate values.

ZONE SYSTEM WITH FIVE-CENT CENTRAL AREA SHOULD HAVE FAIR TRIAL

If a 6-cent fare were adopted and failed to produce the desired financial result, the tendency would be toward a still higher unit or toward a zone system with 6 cents as the minimum fare. It is easier to increase the minimum than to reduce it. When a company is in need of additional revenue, it hesitates to try a lower rate, and it is doubtful how far the commission may have power to compel such a trial to be made. On the other hand, if the zone system were now adopted, with 5 cents as the minimum, it would be a comparatively simple matter, if the results proved unfavorable, to change back to the present plan and try a uniform 6-cent unit.

In short, the commission remarks, the methods of increasing electric railway fares are now admittedly in their experimental stage. Rates of 6 cents, 7 cents and 8 cents and a mileage system of charging are all on trial in Massachusetts at present. Without in any way committing itself to any method which must necessarily be followed in other cases, the commission believes that the so-called zone system of charging which permits city systems to increase fares without raising the 5-cent rate in the central district ought to have a fair trial, and that, on present evidence, this method is especially well adapted to the Holyoke situation and likely to produce the most satisfactory results for all concerned.

FIRST ZONE PLAN IS MODIFIED

The general scheme for such a zone system which was suggested by the company is said to seem on the whole well-devised. The limits of the inner circle include the compact, densely-settled central district and appear to have been logically located. The two zone plans are very similar, and either one may be used as a basis. In taking the first plan, however, in the judgment of the commission, the following modifications should be made:

1. Tickets good for rides between points in the inner circle and points in the outer circle located on the West Springfield, Chicopee Falls, Chicopee Street, Fairview and South Hadley Center lines should be freely sold, both at convenient outside agencies and on the cars, at the rate of six for 40 cents, and the fact that such tickets are available should be advertised by conspicuous notices on the cars.

2. Provision should be made, either by ticket sale or otherwise, for a rate of 7½ cents for local rides between points in the inner circle and Smiths Ferry or intermediate points on the Northampton line, and between points in the inner circle and the city boundary or intermediate points on the Westfield line. On the latter line, the company may, if it desires, limit this local fare to the hours when working-men are going to or from work.

3. Lap-overs should be provided for the South Hadley Falls and Willimsett districts, so that passengers may ride

between South Hadley Falls and South Hadley Center and between Willimsett and other parts of Chicopee for a 5-cent fare. This can, in the commission's judgment, be done without great inconvenience to the company.

4. Special tickets should be sold at the rate of five for 50 cents good between points on the Fairview line and the city of Chicopee and points on the Chicopee Street and Chicopee Falls line in the same city.

5. Free transfers should be given at the City Hall to all points within the inner circle, and these should be available to passengers using tickets as well as to those paying cash fares.

The commission indicates no change in the case of the 7-cent fares proposed on the Amherst and Sunderland line, for the operation of this division has been unprofitable, and the company is fairly entitled to additional revenue if it can be secured. The commission, however, suggests that the company, in its own interest, might well consider the adoption of some plan, either by the sale of tickets or otherwise, whereby local rides could be secured for reasonable distances within the town limits of Amherst at a rate not in excess of 6 cents.

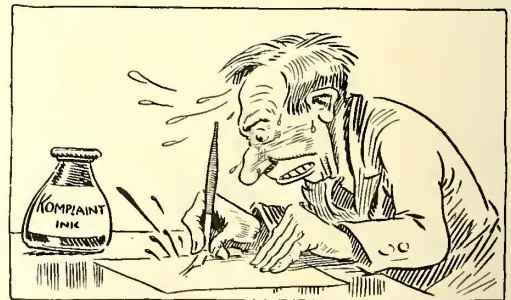
It is possible that the 7-cent fare on this division may not result in the anticipated improvement, and the company, the commission says, should keep a careful record, so that its effect may accurately be determined with a view to possible modifications in the future.

This should also be done in the case of the plan as a whole. It should be clearly understood that the plan is subject to review at the end of one year with a view to possible modifications in the light of experience gained during that period and of the additional information which the company should in the meantime secure by an intensive study.

Courtesy and Safety

THE National Safety Council finds that there is a relation between handling complaints and insuring safety to passengers. The recent poster reproduced herewith tells its own story.

"I Take My Pen in Hand—"



Letter from a Peeved Citizen

Mister Manager:

You talk about your conductors working hard and being courteous. They do nothing nine tens of the day but stand around and view the passing scenery. My wife with her child went down town the other day and the child is heavy to carry. When she got on the car did the conductor show sum of your famous courtesy and help her? He did not. Did the motorman start the car easy? He did not. Then when the car got down town did the conductor help my wife and child which was heavy to get off? Hello. Your conductors are loafers who are afreede to do a little courtesy for feer it will strane there back. What are you going to do about it?

A PLANE CITISEN.

It Is Not Entirely a Matter of Courtesy—But One of Safety

A FORCEFUL N. S. C. COMPLAINT-SAFETY POSTER

Railroad Electrification as a War Measure

The Author Shows that It Will Be Profitable
in Spite of the High Cost of Labor and Materials

By F. E. WYNNE

Engineer Railway Section, General Engineering Division,
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

TRANSPORTATION, whether by rail, water or highways, is a most vital factor in prosecuting the war. The service demanded of the railroads of the United States by the present immense volume of traffic, largely due to the requirements of war, has demonstrated very clearly the inadequacy of our existing railroad facilities. Among the urgent necessities of the situation are larger and better arranged terminals, greater track capacity, increased train loads, higher speeds, more efficient motive power, and the conservation of fuel, materials and men. The practical patriotism which the railroads have displayed in combining management, facilities and equipment for the period of the war is accomplishing wonderful results of incalculable value. However, as the situation becomes more acute, through consumption of men and materials, other means may be necessary to secure the essential result.

The *Bulletin of the National City Bank of New York*, for November, 1917, on "Economic Conditions," contains the following comment:

There is naturally a feeling of uncertainty and apprehension as to industrial conditions after the war. The demand for war materials will fall off, the supply of labor on the market will be greatly increased, and it is a question whether all of this labor can be promptly placed in employment. It will be the most stupendous reorganization of industry ever known, and it is going to be a great social problem to accomplish this change without confusion, loss of confidence and a period of stagnation. It is important that plans be laid on a large scale to take up the slack, and other countries are laying them. In this country, ready at hand, is the task of equipping the railroads, and other industries where practicable, to operate by electric power. . . . The amount of work in sight, if a general scheme of electrification was undertaken, would be sufficient to relieve the business community of its fears as to idleness and poor trade for some years to come, and would thus encourage other enterprises to go ahead.

The danger will be in a pervasive feeling of uncertainty, causing men to wait with their own plans until they can discern the general trend, and waiting of itself slows down business. Large plans for the employment of labor which can be brought definitely forward at the critical time will serve to inspire confidence and support the whole situation.

It seems pertinent at this time, therefore, to consider seriously what electrification is capable of doing for the railroads now, at the same time bearing in mind the desirability of making definite plans for electrification when peace is finally secured. Conservation of fuel is highly important, not only in order to meet the extraordinary demands of our government and the industries and for export to our Allies, but also because every reduction in fuel movement for domestic purposes adds to the equipment and track capacity available for moving export shipments. Electric operation lends itself to fuel conservation in two ways; either water power is substituted for steam power, or the necessary steam power is produced in a central power plant more economically than by burning fuel on locomotives. In the first case, all of the fuel used for train propulsion, fuel

handling and haulage (which may be as high as 10 per cent of the propulsion fuel), water pumping, etc., is saved for other purposes. In the second case, approximately one-half of the fuel is conserved, it being a well-established fact that 1 lb. of coal burned in a modern electric power house will produce as much transportation as 2 lb. burned in steam locomotives.

The government requirements for fuel oil are enormous and the supply is restricted on account of the reduced output from domestic fields, Mexican conditions and the fact that the Roumanian fields are in the possession of the Central Powers. Railroad electrification could relieve this situation considerably and water powers are already available or may readily be developed for the electric operation of many of the most difficult sections of the railroads now using oil-burning locomotives. However, the smaller fuel consumption now obtainable by the use of steam-driven stations is equally as important as the utilization of water powers, because the densest railroad traffic and the greatest congestion is in territory within easy range of the best coal fields, but where water power is scarce or extremely costly to develop.

ELECTRIFICATION A CONSERVATION MEASURE

At first glance, electrification may seem not to tend toward the conservation of materials. The construction of overhead lines, substations and possibly power stations calls for a large amount of material, a considerable proportion of which is copper and steel. On the other hand, fewer electric locomotives than steam locomotives are required to produce the same quantity of service. Where congestion is becoming unendurable electric operation will give relief which, with the continuance of steam power, could be obtained only by building additional tracks and greatly increasing the steam motive-power equipment. The steam locomotives released by electrification and the cars relieved from hauling railroad fuel take the place of new locomotives and cars for increasing the capacity of unelectrified divisions. It is apparent, therefore, that these features indicate the conservation of materials by means of electric operation.

Diverting millions of men from peaceful pursuits to war activities impose upon those remaining the duty of working more efficiently. To this end, machinery must replace and release men to a greater extent than heretofore. Railroad electrification helps to conserve man power both directly and indirectly. Since it has been proved practicable to build, and operate with one engine crew, electric locomotives more powerful than steam locomotives, fewer enginemen are required to handle a given traffic electrically. Not only can larger trains be operated at higher speeds, but delays on the

road are materially reduced and there is less overtime and little conflict with the sixteen-hour law. The operation of larger trains at higher speeds also decreases the number of train crews for a given traffic. Material reduction in the roundhouse and shop labor of caring for and repairing motive power is found with electric locomotives. This is effected largely by the elimination of the boiler, firebox and tender which are essentials of the steam locomotive and by the longer time possible between "shoppings."

The combination of engine divisions, together with more exact and more reliable movement of trains with electric power, makes possible a further conservation of man power by reducing the number of dispatchers required to operate a given trackage. The indirect reduction in men comes chiefly through the fuel reduction or elimination. This releases men from mining coal or producing oil, from handling this fuel, and from operating and maintaining equipment in railroad fuel service, so that they are available for performing similar or other service in producing fuel and transportation for the needs of our government, industries and Allies. Of course, all of the man power thus conserved is not a net gain, because the maintenance and operation of power house, substations, transmission and distribution systems require the time and energies of some men not employed in the operation of a steam railroad. However, in any case, the net reduction in men required is great and increases more rapidly than in proportion to the extent of the electrification.

SAVINGS FROM INCREASED TRACK CAPACITY

One of the greatest benefits derived from electrification is the increase in track capacity without laying additional rails. Probably there are few places where, under steam operation, the capacity of existing track could not be increased by the use of larger, more efficient locomotives, changes in train make-up, increased car-loading and modified operating conditions such as the "sailing dates" for l.c.l. freight recently introduced on certain railroads. All such improvements can be secured equally well with electric operation, and in addition still larger trains may be operated at higher speeds with greater safety and reliability and fewer delays. These results are obtained through the ability to concentrate in an electric locomotive greater power than in a single steam locomotive, to operate locomotives in multiple, and in the electric locomotive's smoothness of control, its greater availability for service, the greater mileage between overhauling periods, the reduction in railroad fuel handled, the less serious nature of road failures, the elimination of intermediate engine terminals, and the definite speed of operation on the road.

The movement of trains at higher speeds with fewer delays and less damage enables greater mileage to be secured from cars in a given time. This saves time in furnishing any quantity of transportation service and the time thus conserved is equivalent to increasing the number of cars available for service. In fact, it is more than equivalent, for there is less likelihood of congestion in handling a certain traffic with 1000 cars than if 1200 cars are required to accommodate the same traffic.

The *National City Bank Bulletin* for December, 1917, contains the following:

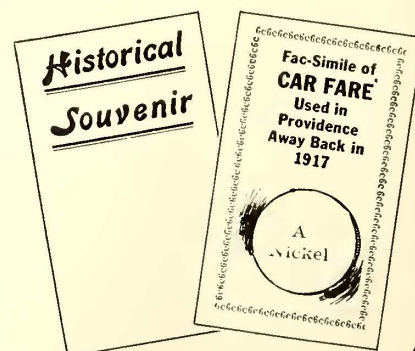
The industries cannot expand beyond the limits fixed by the supply of pig iron, coal and railway service. If government funds can be used to remedy this situation it will be the most effective use to which, at this time, they can be applied. Here is the narrow place in the road, and if it can be widened the energies of the country will produce immensely greater results.

Electrification is admirably adapted to "widening the narrow places" in the railroads. The greatest congestion, aside from terminals, occurs on roads handling ore, fuel, grain and munitions. The suggested use of government funds (where necessary) to assist in relieving this congestion appears to be both legitimate and logical. Government assistance might be secured in getting priority of manufacture also, since the apparatus to be built would be utilized to improve transportation facilities largely for government business. The manufacture of a number of electric locomotives would release a much larger number of steam locomotives and take some of the present burden from the steam locomotive factories by reducing the number of boilers, tenders, engine frames and running gears which such factories would have to build for a given amount of relief.

Not only must maximum capacity of existing facilities be secured but increased facilities at the weak points of our transportation systems should be provided with the utmost speed. Labor should be diverted from non-essential channels to the construction of these additional facilities. The diversified character of the materials and apparatus used and the greater service obtained from equal weight of material in electrical service make it practicable to secure a definite increase of railroad facilities with electrification more readily than by building additional tracks, widening tunnels and bridges and building additional steam locomotives. Incidentally, in many cases, electrification is economically the best method of securing such increase in track capacity. It appears, therefore, that intelligent consideration of the present situation, the probable duration of the war and the future of the country, carried on jointly by our government and the railroads, should lead to some electrification immediately and to the greater use of electric power by railroads when peace comes.

"Looking Backward"

THE Rhode Island Company, Providence, R. I., at a recent souvenir dinner of the "Town Criers" did a little advertising stunt that created considerable com-



SOUVENIR DISTRIBUTED BY RHODE ISLAND COMPANY

ment. At each plate it caused to be put a little "historical" souvenir (1¾ in. x 3 in.), showing a fac-simile of the car fare used in Providence "away back" in 1917. The idea seemed to make a hit with the diners.

Reasonable Rate of Return Has Advanced

At Recent Milwaukee Fare Hearing Mr. Mortimer Discussed Hazards and Needs of Electric Railway Industry—Fundamentals of Proper Wage Basis Outlined—Need Emphasized of City Co-operation in Effecting Economies

AT A HEARING before the Wisconsin Railroad Commission on Dec. 20, on the application of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company for revision of rates of fare, filed on Nov. 6, 1915, J. D. Mortimer, president of the petitioning companies, testified as to additional revenue requirements, efforts in economy and efficiency, and prevailing rates of return on public utility investments. A synopsis of Mr. Mortimer's remarks is given in subsequent paragraphs.

HOW THE INVESTMENT HAS GROWN

The original cost of the railway property of the Milwaukee Electric Railway & Light Company on Dec. 31, 1916, was \$19,972,896, amounting to \$4.33 of investment per \$1 of annual operating revenue. The corresponding ratio for the year ended Dec. 31, 1911, was \$4.18 of investment per \$1 of annual operating revenue. The increase in investment per \$1 of corresponding operating revenue during the five-year period was \$5.25.

The original cost of the Milwaukee Light, Heat & Traction railway property on Dec. 31, 1916, was \$9,204,441. This investment was \$9.13 per \$1 of annual operating revenue. The investment ratio was much higher in the case of this company, with its suburban and interurban business, than in the case of the Milwaukee Electric Railway & Light Company, serving the city business, due to the difference between the annual earnings per mile of track.

The ratio of operating expenses, including depreciation, to operating revenues for the twelve months ended Oct. 30, 1917, in the single-fare area was 82.7 per cent. To produce an 8 per cent rate upon the property would have required an operating ratio of 68 per cent, and it would have been necessary to increase revenues \$723,377 to achieve this ratio. The ratio of utility capital to operating revenue would then have been reduced to \$3.49.

1918 WILL SEE HIGHER COSTS

These figures, Mr. Mortimer said, summarize conditions as they obtained during the twelve months ended Oct. 31, 1917, and do not cover increased operating expenses which will be experienced during the ensuing year. The largest single item of expense is the wages of the trainmen, and it is believed that these should be increased at least 15 cents per man-hour. Such an increase when applied to the city and suburban zones would amount to \$660,000.

Another item of increase is the cost of power. For the twelve months ended Oct. 30, 1917, this amounted to \$566,193. Coal cost \$3.67 per ton. For October coal cost an average of \$4.35 per ton, while effective Nov. 1, 1917, there was a further increase in price of coal of 45 cents per ton. In view of the possible further increases in cost of coal at mines, increase in freight rates, war tax on freight and increase in storage and

handling costs, it is reasonable to predict that the cost during the ensuing year will be increased an additional 75 cents per ton. Substantial necessary increases are also scheduled for labor in power plants and substations. The total increase in power cost will amount for all railway departments to \$253,200, of which \$223,000 is applicable to the city and suburban fare zones.

Maintenance of equipment costs are similarly estimated to increase \$110,000, of which \$96,700 is apportionable to the Milwaukee city and suburban system. Maintenance of way and structures expenses are anticipated to increase \$106,300 for the entire system, \$75,400 for the urban and suburban business. Wages of miscellaneous car-service employees, carhouse employees, car cleaners, telephone operators and miscellaneous transportation expenses are likewise estimated to increase \$88,756 for the system as a whole, of which \$82,100 would be chargeable against the Milwaukee city and suburban zone. Mr. Mortimer also pointed out that many of the items of general expenses, undistributed expenses and taxes will sustain important increases, estimated at \$184,100 for the entire system and \$167,000 for the Milwaukee city and suburban zones. Summarizing the probable increases in operating cost, Mr. Mortimer stated that these were estimated at \$1,471,550 for the entire railway department and \$1,304,200 for the city and suburban business.

REASONABLE RETURN TO-DAY HIGHER THAN YEARS AGO

Mr. Mortimer then noted important changes that have taken place in the returns demanded by investors in electric railway securities. The capital invested in public utilities is planted and must be considered as invested in perpetuity. The problem of determining a reasonable rate of return is necessarily one of the future. The investor considers the actual return which his money will earn in good years and bad, and the prospects for future increase. No investor will knowingly put money into an enterprise where prospects are they will suffer loss. The prospects for future increases either in rate of return or in margin of safety are very important considerations in inducing investors to part with their savings.

In Mr. Mortimer's opinion, the great mistake made by regulation in many states is that its calculations have been based entirely on past records without forecast of future conditions. When, about ten years ago, commissions announced that a return of 7½ to 8 per cent, made up of 6 per cent for interest or pure cost of money and 1½ to 2 per cent as profit of the proprietor, would be allowed on capital invested in public utilities, investors assumed that these returns would be assured in bad as well as good years. Such a policy had a tendency to stabilize investment values. The failure of such returns to materialize during periods of depression has now placed public utility investments in a semi-hazardous class.

Investors expected that all new investments made since the beginning of regulation would be allowed at least the announced rates of return. They did not anticipate that these investments would be subjected to valuation at amounts considerably below the actual investment. It was also not anticipated that the rise in commodity prices and in rates of wages would outrun any possible economies which could be effected, nor was the full effect of additional burdens through the exercise of municipal police powers and by the imposition of service orders by regulating commissions appreciated either by the investors or by the commissions. Returns have accordingly not been stable.

At the present time the enormous government borrowings running far beyond anything in this country's experience, and paying much higher than the usual rate of interest of borrowers in pre-war days, have contributed to a rapid rise in the old interest plane. The problem of reasonable return to-day is accordingly a very different one from what it was nine years ago when interest rates were on a much lower level than is now the case. Returns of 7½ to 8 per cent are to-day wholly inadequate for the purpose of securing additional capital to flow into the business. A return of 10 per cent to 12 per cent might accomplish such a result, but this is not at all certain.

Shortly after April, and for a few months during the summer, it was possible for public utilities to finance themselves temporarily by the sale of short-term notes secured by bonds, but the interest-rate cost to the issuing company was 8 per cent per annum or more. This figure is higher than public utilities are earning, but even then the amount of money that could be secured by this means was comparatively small. It is a well-established economic fact that there is a marked tendency for security values to depreciate as the prices of commodities rise—that is, the interest yields increase with an increase in commodity prices. Hence, Mr. Mortimer said, it would appear that in the ideal system of regulation there should be some advance in the reasonable rate of return as commodity prices increase in order to parallel as far as practicable the increasing cost of money and the other factors that go to measure a reasonable return from time to time.

HAZARDS OF THE ELECTRIC RAILWAY BUSINESS

The hazards of the electric railway business are very important considerations in determining whether or not it is a good business for a man to engage in as an employee or wage earner, and as a business in which to invest money. The particular hazards of the business enumerated by Mr. Mortimer are variation in gross earnings arising from fluctuation in business conditions, competition with other forms of transportation, small rate of growth of earnings, the general rise of the wage level and cost of materials, higher service standards, increased wages, unproductive investments required by municipal enactment (such as paving within the track zone, placing wires underground, grade crossing separation and abandonment of existing lines before the normal useful life of the utility property has expired) and uncertainties of valuation arising out of lack of agreement on fundamental principles.

The rate of return upon the bare cost of reproduction of the physical property used and useful in the single-fare and suburban areas amounted to 4.52 per cent for

the year ended June 30, 1914; 3.28 per cent for the year ended June 30, 1915; 4.23 per cent for the year ended June 30, 1916; 4.79 per cent for the year ended June 30, 1917, and 4.20 per cent for the year ended Oct. 31, 1917. The basis upon which these returns are computed does not include working capital, stores, or going value. The cost of money can be reduced and the rate of return stabilized by contractual guarantees on the part of the municipality. This method will go some distance in reducing the cost of capital and the cost of service.

RATE REGULATION SHOULD BE AUTOMATIC

In Mr. Mortimer's opinion, regulation of rates of fare or lengths of haul should be automatic. It should not be necessary that the commission be required to hear a case on a petition initiated by some party every time the rate of return increases or decreases one-half of 1 per cent. It is entirely conceivable that the commission can establish fundamental factors upon which the rates of fare are to be computed or the distance traveled for the same fare and have the same modified automatically at three or six months intervals as the conditions of the time demand.

WHAT CONSTITUTES A PROPER WAGE?

With respect to the wage policy of the company, Mr. Mortimer pointed out that public utility employment should be the most stable and best paid in the community. Economy can only be obtained with competent employees, and the greatest competency can only be obtained by stable service. Stable service requires most favorable working conditions, such as the eight-hour day and the highest rate of wages. It is believed that the public desires well-paid employees.

The index number of the cost of living indicates a substantial increase in living cost. If the year 1914 is taken as a reference wage basis, the relative cost of living may be taken as 146. The relative average for the year 1916 would then be 176 and for the year ended Oct. 31, 1917, it would be 259. The cost of living for November, 1917, alone shows an increase of 90 per cent over that obtaining in 1914.

The management of the Milwaukee companies believes that the proper wage should consist of three elements: (1) a component that would measure the cost of the necessities of life and vary at six months intervals with some reliable index number of commodity prices; (2) an amount determined by individual or group efficiency according to reference standards, and (3) an amount determined as the employees' share of surplus profits. The company has numerous profit-sharing plans in operation, but it has been unable to include in these the sharing of surplus profits since such profits did not exist.

It is expected that during the continuation of the war there can be no additions to the electric railway system. Such a policy is in the interest of the nation, in order that all money, materials and labor may be available for the use of the government as far as practicable.

ECONOMIES POSSIBLE WITH MUNICIPAL CO-OPERATION

As affecting the increased costs of operation, however, Mr. Mortimer averred that there are opportunities for economy through a policy of co-operation with

the municipal authorities. An increase in schedule speed by introducing alternate stops would permit a reduction of about 8 per cent in car-hours for the same number of car-miles. The number of car-miles operated can be further reduced by modifying service standards to conform to wartime conditions. Economy can also be effected by modification of present ordinances relating to car heating. There are substantial opportunities for economy in relief from such unnecessary burdens as sprinkling streets, removing snow and ice, paving within track zone and changing track grades.

A hostile municipal administration increases the hazards in the business and increases the rate of return, by not less than 1 or 2 per cent, which investors have a right to demand as reasonable before placing their capital at the disposal of the public. The advantages of open municipal co-operation are readily evident, and no municipal or state official is performing his sworn duty when his official acts are hostile to the public utilities serving the district in which he acts.

In conclusion, Mr. Mortimer stated that the present methods of regulation are much too ponderous and slow to meet the requirements of the times. Near-bankruptcy must be shown in order to procure adjustments of fares, hauls and service.

Parcel Freight Plan for Chicago

Tentative Ordinance to Be Prepared—Conference Between Aldermen and Companies Brings Out Important Points Regarding Freight Possibilities

REVIVAL of a plan to permit the elevated and surface lines in Chicago to carry package freight was initiated on Jan. 4 at a meeting of the local transportation committee of the City Council. The discussion resulted in a request on the Corporation Counsel to provide the companies with a draft of a proposed ordinance to be worked out by them in a form satisfactory to all parties.

Representatives of both systems agreed to hurry up the presentation of a tentative ordinance. The aldermen conceded that the public probably would not object to the hauling of freight cars if there was no interference with passenger transportation. It is thought that an ordinance can be drafted which will specify certain classes of freight to be handled and will permit the cars to be operated during all except the rush hours.

NO HEAVY INVESTMENT FOR SHORT-TERM USE

An important point brought out by the traction representatives, John E. Wilkie for the surface roads and G. T. Seeley for the elevated lines, was that the railroads should not be required to make an investment in switch tracks, sidings, elevators and connections between the two systems under a short-term arrangement. Such changes would require a heavy investment, and there was no assurance that the plan would be accepted if its operation were only for the war period.

GENERAL HAULING AND TWO-WAY BUSINESS DESIRED

For some years past there has been discussed at intervals a plan to haul market produce on the tracks of both systems. The surface lines already haul garbage cars under an arrangement with the city, which provides a safe margin of profit. There is also a limited handling of small freight over one of the city lines by cars of

the Kankakee Interurban, reaching to Sixty-third Street, a point about 7 miles from the downtown district. All this business, however, is confined to a few hours after midnight.

The electric lines contend, however, that an increase of such business would not be worth while unless the period for freight handling is extended to cover all hours of the day other than the rush hours. Another contention is that any ordinance to be favorably considered should provide for the hauling of such classes of freight as would give a two-way business.

The elevated roads are in a favorable position at the present time to handle considerable merchandise if satisfactory arrangements can be made for connections with the Great Lakes Naval Training Station, Fort Sheridan and Camp Grant.

The surface lines, of course, cannot compete for such business. One handicap under which they labor is the type of rail, which will not permit the use of the ordinary interurban car wheels. It has been suggested, however, that a wheel design could be worked out for freight cars of the surface and elevated lines, which could be used by both.

POSSIBILITY OF DEPARTMENT STORE TRAFFIC

The management of the Chicago Surface Lines some time ago endeavored to interest the large department stores in a proposition to take merchandise from the downtown stores to outlying distributing stations owned by these stores. This would have meant the handling of such business after midnight. The department store officials were somewhat interested, but they said that a large portion of their purchases must be delivered the same day. It is thought, however, that the patriotic spirit inspired by war times might bring about such a change in public sentiment as would permit the delay of such shipments for a possible twenty-four hours. This would give the stores and the companies an opportunity to get together on the night-handling of such packages.

Another objection made by the stores was that they have a large investment in motor vehicles, which could not be used for another purpose. They also contended that they would lose a certain amount of advertising by the removal of such motor trucks from the street. Some aldermen, however, have gone on record as favoring a reduction in the number of such trucks, because of their noisy operation and their wear and tear on pavements.

QUESTION OF MILK DISTRIBUTION IMPORTANT

The question of milk distribution also enters largely into the present discussion. The Aurora, Elgin & Chicago Railroad, which operates to the city's center, is permitted to haul freight cars only to a point about 7 miles distant from the downtown district.

Mr. Seeley referred to the handling of freight in Detroit, Boston and Philadelphia. He said that in Detroit the company handles about 90 per cent of the milk entering that city.

According to the *Manchester Dispatch* the Germans have built a large number of trackless trolley lines as a substitute for motor bus transportation. This is because of the scarcity in Germany of gasoline as well as rubber for pneumatic tires.

The Zone System in Practice

Experience With the Zone System Lasting Several Years on the City and Interurban Lines of the Shore Line Electric Railway Proves Its Desirability. The Zone Rate Has Been Raised 50 per Cent in This Time Without Adding to the Difficulties of Fare Collection

BY R. W. PERKINS
President Shore Line Electric Railway

THE Shore Line Electric Railway consists of 240 miles of track in eastern Connecticut, including the city systems in New London and Norwich. These cities have a population respectively of about 18,000 and 22,000, but Norwich really should be considered to include in its area the town of Norwich, which would make its population more than 30,000.

This system was made up of a number of independent properties, all operating on a 5-cent zone system. When they were consolidated there were a number of troublesome questions involved in the matter of transfer from one line to another, and many of the divisions lacked sufficient revenue.

To increase the revenue, the first proposition was to increase to 6 cents per zone, and approval of this change was voted by the board of directors, but after more mature consideration, it was felt that this simply emphasized the faults of the old nickel-zone system, and the officers went into a very careful study of the property with an idea of adopting some more modern method of charging for passenger transportation.

A plan of the property was made and the exact mileage determined to every white pole stop. Then each particular community received careful consideration with regard to the direction in which the people most often traveled. The location of the new zone terminals was then determined upon. These zones vary in length according to density of population and volume of business.

The shortest zone on our line is about $\frac{3}{8}$ -mile in length, and the longest one 2.4 miles, and in each of these zones we are charging 3 cents with a minimum charge of 5 cents for a single zone; 7 cents in two zones; 9 cents in three zones and so on in multiples of three, except that within the city areas of Norwich and New London we permit a ride of two zones for a nickel. This, in some instances, calls for the issue of a transfer, although on the main-line cars this would mean a ride into or through two zones without a transfer, the long-distance rider paying 3 cents a zone in these same zones.

The application of the zone system calls for a good deal of study, and I think that is what has restrained many of the railway managers from adopting it. There is a certain amount of opposition on the part of the operatives to a change of any kind where they have been using the nickel register, but after our men became familiar with the system I think the majority felt that they would oppose the idea of going back to the old 5-cent zone, where it meant going through the car four or five times, and in some instances as many as thirteen times on a trip.

According to the present plan, when the conductor

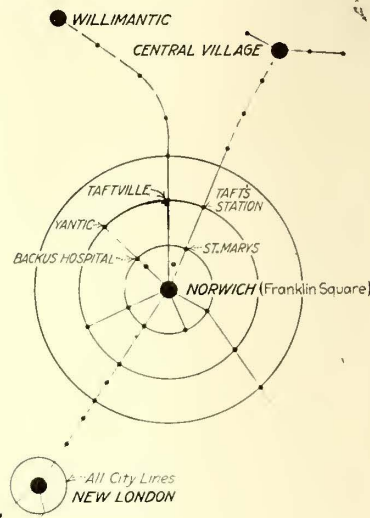
EXPLANATION

Formerly a 5 cent fare with transfer included a ride practically anywhere within the two inner circles. This is now limited, as follows:

A 5 cent fare covers a ride from Franklin Square to the outer edge of the first circle and, by use of transfer, a ride anywhere within the inner circle but not outside the city line.

The fare from Franklin Square to any point in the second circle is 7 cents and from Franklin Square to any point in the third circle it is 9 cents. The fare then continues at the rate of 3 cents a zone to New London, Westerly, Willimantic or Central Village. These points are suggested by the broken lines.

A 3 cent zone rate applies for riders through the city of Norwich. For instance, from Yantic to Franklin Square, with a transfer at that point to Taftville, is now four zones. Again, a ride from Yantic to Backus Hospital, Backus Hospital to Franklin Square, Franklin Square to St. Marys and then to Taft's Station would be through four zones or 12 cents. This ride was formerly 5 cents.



goes through his car the first time he rings up all the nickel fares on the register and issues an identification check punched to destination to each passenger paying more than 5 cents.

We find one marked advantage in retaining the nickel. Our city rider is not affected by the increase, and we do not lose patronage from the people who can most easily get on without us; that is, the very short rider. In fact, the division of our property in which our city zones appear shows a much larger increase in gross than is apparently the experience of those systems that have changed to the higher unit of 6 or 7 cents. As an example, take our so-called New London division, which includes the cities of Norwich and New London. Our change of rate went into effect on Oct. 4, and for the following month we showed a gain in receipts of 17.46 per cent.

There is one great advantage, it seems to me, in the adoption of the zone system, namely, that it places the sale of transportation upon a basis that is right. Consequently the rate per zone can be readily varied from time to time, according to the cost of producing the service. In other words, if a road has a rate of 2 cents a zone and finds that this is not sufficient, the rate can be increased to $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{3}{4}$ or 3 cents with no more difficulty than the steam railroads change from one rate per mile to another, except that the local fares often involve the use of the fraction of a cent, calling for a charge of the next higher unit. We changed our interurban fares from 2 to 3 cents a zone, which represents about 2.7 cents per mile.

We believe absolutely in the need of using a zone varying in length, or the so-called flexible zone, to meet the varying conditions of a property that covers both city and interurban service and the study necessary to make the length of zones equitable is the greatest difficulty in connection with the system. Our patrons also consider the plan a fair one.

How Use of Fuel Will Be Economized

Fuel Administration Schedules Public Utilities for 100 Per Cent Supply for 1918

THE United States Fuel Administration has made public the method adopted for supplying coal and other power-producing fuel to the industries of the country classed as not absolutely necessary to the conduct of the war. The method is called the "coal-budget plan."

Committees representing the large industries not engaged in war work, more than one hundred in all, will be called into conference with the officials of the Fuel Administration. They will be shown the amount of coal available for all purposes, the amount required for war purposes and domestic consumers and the total curtailment of the use of coal which must be effected to satisfy these demands. They will be asked on patriotic grounds, as well as for their own future interests, to volunteer in behalf of their respective industries a reduction of the coal consumption for the year 1918. They will be asked to show the Fuel Administration the best method of accomplishing this curtailment. They will also be asked to advise the Fuel Administration as to how to arrange these restrictions so as to affect only the less essential portions of their own lines of business, if possible.

When an agreement is thus reached as to the quantity of coal to be conserved in each industry the Fuel Administration order will be issued, making this agreement effective as regards the total industry involved.

The voluntary annual saving shown by the first dozen industries called into conference promises to be between 15,000,000 and 20,000,000 tons. The total offering, from all non-war industries, will be between 36,000,000 and 50,000,000 tons for the year 1918.

One of the striking instances of curtailment is in the brewing industry. Representatives of the American Brewers' Association and others affiliated with the industry, after a conference with the Fuel Administration, volunteered a reduction of 700,000 tons annually. Other industries whose representatives have been to Washington already are paint and varnish, wall paper, confectionery, artificial ice, boxboard and glassware. The voluntary reduction of one day's running per week on the part of the boxboard manufacturers amounts to 1,000,000 tons a year and will take 30,000 carloads of merchandise freight off the congested railroads. The Fuel Administration asks that other industries affected get in touch with Washington without waiting for formal notice.

It is believed that the operation of this plan of voluntary conservation on the part of non-war industries will forever lay the ghost of the "cut-off-the-non-essential-industries" agitation, which has been going on since the United States entered the war, and automatically will balance the relation between the production and consumption of coal and prevent any repetition of the present coal shortage.

It is not the least of the merits of this plan, according to the Fuel Administration, that it is simple. Perhaps its greatest merit lies in that fact that such restrictions on fuel consumption as are absolutely necessary to keep the budget balanced will be arranged by the industries restricted and will be volunteered by

them. The Fuel Administration merely comes in at the end with an order to make the voluntary curtailment fully effective.

Fuel needed in 1918 for army and navy purposes, for munition works, for public utilities, for domestic consumers, and for factories working on war material is scheduled in the budget for 100 per cent fulfillment. With this figure, and the estimated production of coal during 1918 as a basis, a subtraction shows the amount of fuel left for non-war industries.

The percentage of reduction asked of the different industries by the Fuel Administration will, of course, vary, partly upon advice of the leaders of each industry as to what is practicable and safe shrinkage as compared with the great business activity of 1917; partly, also, it will vary with the character of the business. In proportion as an industry contributes less to the war of domestic necessities, it will naturally increase its contribution of self-limitation.

One advantage of the plan is elasticity. The total curtailment of coal consumption when completed will theoretically equalize the coal demand of the country with the coal supply for 1918. If later it turns out there is still a prospect of scarcity, a slight increase of the voluntary curtailment can be arranged instantly and without confusion. Every industry through this first order will be in touch with the government and its requirements. It can put into effect a still further curtailment if necessary, or it can quickly increase its activity if notified by the government at a later date that the curtailment already arranged appears to be excessive.

This plan, if completely successful, will quickly solve the fuel problem and will introduce a new and valuable principle into the settlement of many difficult war problems. First: Advantage is taken of the unquestioned patriotism of a large majority of business men to devise with their aid an intelligent program of curtailment, sufficient for government purposes but not destructively exaggerated. Second: An order of the Fuel Administration backed by the authority and penalties of the Lever law will compel an equal compliance by every member of each industry and thus assure those who would gladly make their share of the sacrifice that no advantage will be taken of their patriotism by unscrupulous competitors.

New York Fuel Conservation Committee Holds Meeting

THE fuel conservation committee for the electric railways of the Second Public Service District held a meeting at Rochester on Jan. 10. In addition to the members whose names were printed as members of this committee last week, W. J. Harvie, president Syracuse & Suburban Railroad, is a member. H. B. Weatherwax, vice president United Traction Company, Albany, is chairman of the committee.

After a week's shutdown at the Fern Hill coal mines outside of Owensboro, Ky., due to the blocking of railway tracks by snow, the Owensboro Street Railway finally prevailed on the miners to get to work and clear the track.

Loading Surface Cars at 400 Passengers Per Minute in Detroit

Through Co-operation with the Ford Motor Company
Detroit United Transports 30,000 Employees
in Seventy-five Minutes

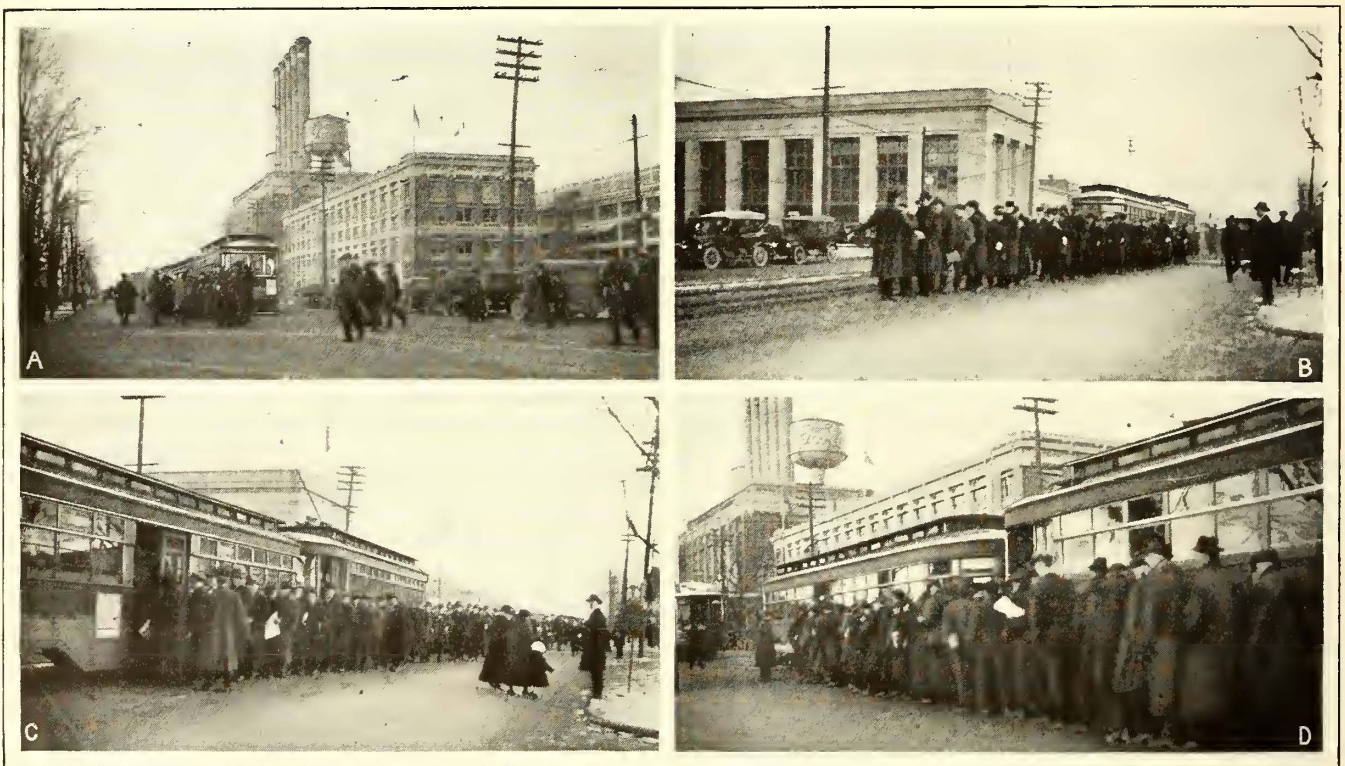
By W. E. CANN

Assistant to the General Manager Detroit United Railway

THE transportation of the employees of the Ford Motor Company has presented problems of no small difficulty to the transportation department of the Detroit United Railway. In spite of the company's best efforts it found great difficulty in handling crowds of 10,000 to 20,000 men, all anxious to get home on the first car. There was so much crowding that many fares were missed, intending passengers even climbing into the cars through the windows. After some months of this experience and without being able, even with the

both the motor car and the trailer are stationed employees of the railway company, the man at the motor car being a car starter who dispatches the cars at regular intervals. During the rush-hour peaks in the evening this interval is about thirty seconds. The employees form in two lines, the line nearer the track entering the front car and the other the trailer. When the starter decides that a car is to leave he steps in behind the last passenger on the steps, the man at the trailer car door, who is watching for this move, doing the same. These two men see that the car doors are closed and the car starts on its trip.

For the first week or two of this operation there were some difficulties in keeping the men in line, but after the Ford Company had discharged some of the most obstreperous of its men, the employees began to realize that it was to their advantage to line up and to board the cars in an orderly fashion and in their proper



SCENES ON WOODWARD AVENUE, DETROIT, SHOWING MANNER OF LOADING CARS AT THE FORD MOTOR COMPANY'S WORKS DURING THE AFTERNOON RUSH HOURS

assistance of special police officers and carhouse employees, to develop any semblance of order, the company appealed to the Ford Motor Company for co-operation. As a result a plan has been put into effect which has given very satisfactory results. The operation of the plan is shown in the accompanying photographs.

Now between the hours of 3.30 p. m. and 4.45 p. m. there are handled at the Ford plant approximately 30,000 to 40,000 employees of the plant, and this with good order and dispatch. The benefits of a systematic and just loading plan are now so apparent to the men themselves that they would hesitate before going back to the old way even if given the opportunity. The pictures show the loading only on Woodward Avenue, but the same arrangement is in effect at four or five other points on the streets and on the company's own property in the vicinity.

The plan is simply this: At the entrance doors of

turn. They insisted that the last men to arrive should always be forced to fall in at the tail end of the line.

Under the present arrangement cars leave the Ford works, generally speaking, with something less than a seated load, thus allowing the crews to pick up passengers on the way downtown. It might seem at first that it would be difficult to overcome the objections of men to being stopped from boarding a particular car when there is still room inside. Fortunately the justice of leaving some space for passengers who may wish to board later appeals to the men, and now any dispute is stopped by them by the simple expedient of pulling an objector out of the line and forcing him to the rear.

A committee of prominent railway men from the East who visited Detroit recently to study the operation of this loading plan stated that they considered as no less than remarkable the way in which co-operation had been secured.

“Credit System” of Wage Payments in Chicago

A Novel Plan for Encouraging Long Service Has Been Introduced by the Chicago Motor Bus Company—Each Employee’s Earnings Are Based Upon the Length and Character of His Work, the Older Employees Sharing Also in the Profits of the Company

A NOVEL system of wage payments has been adopted by the Chicago Motor Bus Company, whereby each employee’s earnings are dependent upon a “rating” that is established by the length and the character of his services. The new plan, which has been called the “Credit System” by its originator, Harold B. Weaver, vice-president of the company, applies to all drivers, conductors, starters, inspectors and others occupying comparable positions. Its application is effected by means of “credits” which are given for each month’s service and entered upon each employee’s record, certain “discounts” being deducted from the total in case the employee violates rules of the company. Older employees who, by their long service have acquired a very large total number of credits, participate to a certain extent in the company’s earnings through “employees’ dividends,” these being declared as a percentage of the employees’ annual earnings at the same percentage rate as is paid upon the company’s stock.

CREDITS AND DISCOUNTS

There are three kinds of credits, as follows: Regular credits, which are given for one month’s service; Extra credits, which are given for continued perfect service; Bonus credits, which may be given in the discretion of the company for extraordinary services or on a competitive basis under prescribed conditions.

Regular credits are given at the rate of twenty-five for each month that an employee remains in the company’s service, regardless of his capacity. Extra credits are given after any three consecutive calendar months of perfect service, that is to say, three calendar months during which no discounts have been imposed. Such employees receive five extra credits per month from the fourth to the ninth month (inclusive) of continued perfect service, and thereafter are given ten extra credits from the tenth to the twenty-first month (inclusive), subsequently being given fifteen extra credits per month so long as perfect service is continued. Bonus credits may be given at any time for extraordinary services or unusually efficient work, upon the recommendation of a superior officer and with the approval of a board of employees of the same rank as the recipient.

In the case of violation of any of the rules, there shall be charged to the record of an employee a number of discounts ranging from one to fifty, according to a printed schedule of discounts. These discounts are imposed only by the heads of departments or general company officers, and their application cannot be remitted in case infractions of discipline have actually taken place. Neither can there be imposed any greater number of discounts than fifty for any particular offense.

The record of each employee’s credits and discounts are kept by the company, and each employee has the right of access at any time to his own record, but not

to the record of any other employee. The total number of credits obtained from all sources and total number of discounts imposed for all reasons are totaled at the end of each calendar month, and the total number of discounts subtracted from the total number of credits. The balance of credits represents the “rating” of each employee, and this rating is used as the means for determining his rate of wage and, subject to certain conditions, his right of preference as to work and promotion.

Whenever discounts are charged against the record of an employee, written notification is submitted to him,

CLASS	PER HOUR		PER WEEK		Length of Service on basis of 25 Regular Credits per Month without Extra Credits or Bonus Credits.	Length of Service on Basis of Perfect Service, with Extra Credits but without Advantage of Bonus Credits.	Period of Wage		
	Conductors	Drivers	Starters	Inspectors					
CLASS G	26c	30c	\$22.00	\$23.00	EMPLOYMENT 6 Months 1 Year 1 Year 6 Mo's 2 Years 3 " 4 " 5 "	EMPLOYMENT 6 Months 11 " 1 Year 4 Mo's 2 Years 4 " 3 " 7 " 5 " 5 " 7 " 4 " 9 " 2 " 11 " 1 "	Period of Wage and Participation in Profits		
" F	27c	31c	\$22.00	\$23.00					
" E	28c	32c	\$23.00	\$24.00					
" D	29c	33c	\$23.00	\$24.00					
" C	30c	34c	\$24.00	\$25.00					
" B	31c	35c	\$24.50	\$25.50					
" A	32c	36c	\$25.00	\$26.00					
GRADE 5	Wages of Class A and 1 Unit of Employee Dividend							5 "	5 "
" 4	Wages of Class A and 2 Units of Employee Dividend							7 "	4 "
" 3	Wages of Class A and 3 Units of Employee Dividend							11 "	2 "
" 2	Wages of Class A and 4 Units of Employee Dividend				14 "	1 "			
" 1	Wages of Class A and 5 Units of Employee Dividend				17 "				
					Thereafter				

CREDIT SYSTEM OF WAGES—CHART SHOWING WAGE RATES AND PERIOD OF SERVICE REQUIRED FOR EACH

and in the event that an employee believes a charge of discount to be unjust or otherwise in error, he has the right of appeal by signing his name in the space provided on the notification for that purpose. Such appeals are heard before a board appointed by the president of the company from among officials equal or superior in rank to the one imposing the discount. Witnesses in such hearings may be called by either side, and these are paid their regular rate of wage for the time thus occupied.

EFFECT OF DISCONTINUANCE OF SERVICE

In the event that an employee resigns or is laid off through reduction of force, or if for any other reason not reflecting upon his record he leaves the service of the company, he is given a certificate of honorable discharge which shows his rating at the time. If he again enters the service of the company he starts to work with all of the credits that he possessed at the time he left the service and is entitled to whatever rate of compensation this rating brings.

In the event that an employee again enters the serv-

ice of the company after he has been discharged for cause, he has to start on his duties without any credit whatsoever. Dishonorable discharge is brought about by a failure to perform work assigned to an employee, thus automatically forfeiting all credit acquired up to that time. Discharge is also brought about by the establishment, on an employee's record at the end of his first two months of service, of more discounts than credits. Also, any employee who has been with the company for a period in excess of four months and who for any period of three consecutive months averages less than fifteen credits per month, or for any period of six consecutive months averages less than eighteen credits per month, or for any period of one year averages less than twenty credits per month, is subject to discharge.

Demotion without discharge may be applied at the discretion of the company, but such demotions do not affect an employee's rating nor do they suspend his right to extra credits.

Credits continue to accrue to the benefit of an employee while on a regular vacation, but in case an employee obtains an extended leave of absence from work the accumulation of regular credits during the period of absence is in the discretion of the company, and extra credits for continuous good service do not accumulate.

EFFECT OF RATING ON WAGE

In the schedule of wages seven different classes are provided for, these differing from each other by increments of 1 cent per hour, each class including employees whose ratings, or net total of credits for each month have upper limits amounting respectively to 150, 300, 450, 600, 900, 1200 and 1500. The rates of wage applying to each one of these classes are more or less arbitrarily fixed and may be revised from time to time, the operation of the system being independent of the actual rates of pay by the various classes. Thus if the rate of wage for conductors in Class G (the lowest of the seven classes) is 26 cents, all conductors with ratings of less than 150 will get 26 cents per hour. When a conductor accumulates more than 150 credits he moves up into Class F and is paid 27 cents per hour.

For employees having ratings that are in excess of 1500 credits, there are provided five grades, and these employees, in addition to Class A wages, participate in the company's earnings through an "Employees' Dividend." This is declared at a rate which, if possible, is to be equal to the dividend declared on the stock of the company for the same period, but in no case is the employees' dividend to be less than at the rate of 3 per cent per annum. This dividend is to be based on the total amount of money paid during the period involved, as wages to each of the employees participating in the dividend.

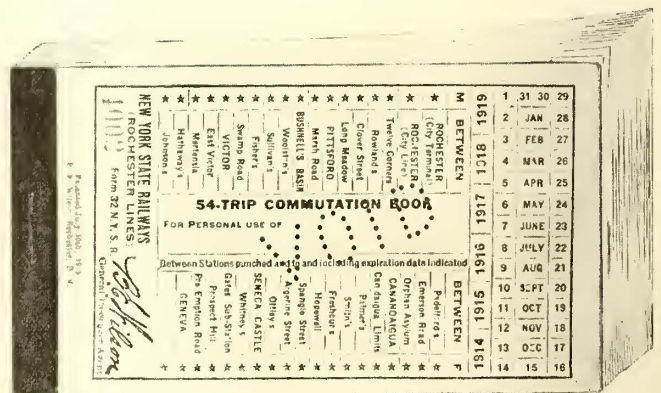
All employees in the five grades that have, during the period covered, earned an average of not less than twenty credits per month are to be entitled to participate in this dividend. Each of those in the lowest grade is entitled to an amount equal to the declared percentage applied to his total earnings during the period covered. For each employee in the next higher grade, the amount of the dividend is based on the same percentage as in the lowest grade, but this percentage is applied to twice his total earnings during the period covered. For the three higher grades the amount is

based respectively on three times, four times and five times the employee's total earnings during the period covered. Thus, if employees' dividend is 6 per cent, the employees in the highest grade receive bonuses equal to 30 per cent of their earnings during the previous year.

In general, it may be said that this system permits employees to enjoy an income which increases over a long period of time and is an inducement for them to remain in the service of the company. Long service not only produces individually efficient work, but also efficiency of the all-important character that co-operates with other members of the organization and is thus of special value to the company. The company recognizes that each employee who remains in its service has, in a sense, an investment value in the company. This is the investment of years of service which, except for general experience gleaned, is of no value to him in the service of another company. Naturally, such a principle points to an eventual participation in earnings by employees, but inasmuch as it is continuous service that is of value to the company, and since it is continuous service alone that is an investment by the employee, any participation must be purchased not with money but with time. In brief, the right to participate in earnings does not accrue to an employee who has not earned this privilege by a certain length and character of service.

Commutation Ticket Book for Interurban Railway Lines

THE New York State Railways and the Salt Lake & Utah Electric Railroad are using a form of commutation ticket book devised and patented by B. E. Wilson, general traffic and freight agent of the first-mentioned road. The feature is that all of the tickets are punched at one time to indicate the points between which the holder has purchased transportation.



COMMUTATION TICKET BOOK FOR USE ON INTERURBAN LINES

The punching is an easy matter and a punch suitable for the purpose can be had at a cost not to exceed \$1. On the New York State Railways a round hole about 1/16 in. in diameter is punched. This company uses a ticket 2 3/4 in. x 4 3/8 in. in size and a weight of paper such that the thickness of a fifty-six-ticket book, including both covers, is about 3/16 in. The Utah line ticket is 2 3/8 in. x 4 1/2 in., and it is on much lighter paper. The proper size and weight of ticket is a compromise of cost and of convenience in carrying the books and handling the coupons.

LETTER TO THE EDITOR

Fundamentals of Successful Transportation

BOARD OF PUBLIC UTILITY COMMISSIONERS
NEWARK, N. J., Jan. 8, 1918.

To the Editors:

In response to a notice on advertising page 20 of the *ELECTRIC RAILWAY JOURNAL* for Dec. 22, under the title "Have You Got the Goods?" I am inclosing a statement relative to the handling of passengers at greater speed, but with greater safety and comfort. While these suggestions are probably not entirely new to operating officials in general, yet their arrangement and grouping may place them before officials and others who may be interested in such a manner as will be conducive to a more intelligent, practical application of some or all of them where practicable.

FOUR FUNDAMENTALS TO BE CONSIDERED

To handle passengers with a maximum degree of speed, safety and comfort in connection with cars operated on surface lines, certain factors should be taken into consideration as follows: (1) Type of car. (2) Character of platform employees. (3) Character and distribution of traffic employees. (4) Education of the traveling public.

1. In designing cars with these objects primarily in view the following points should be observed: (a) Type, arrangement and location of entrance and exit. (b) Seating arrangement; width of aisle. (c) Height and type of step. (d) Type and arrangement of doors.

2. In selecting employees, especially conductors, observe the following: (a) Disposition. (b) Age. (c) Training.

3. As regards distribution and character of traffic employees consider: (a) Transfer intersections. (b) Other points of heavy loading or unloading. (c) Disposition of employees.

4. In educating the public, note the following: (a) Best method of advertising within the cars. (b) Best method of general advertising.

1a.—*Entrance and Exit.*—The rear-entrance and front-exit type, especially for urban and suburban service, furnishes the best type for speed, safety and comfort. For interurban service with few stops the rear entrance and exit will be found satisfactory, although the front exit in such cases is also recommended.

DESIGN OF CAR

1b.—*Seating Arrangement.*—For all urban and for short suburban service, longitudinal seats with ample aisle space should be adopted. For long suburban and for interurban service, cross seats with a reasonably wide aisle is advisable.

1c.—*Steps.*—Low steps should be adopted on cars for all classes of service. Height should not exceed 15 in. from rail to first step, 14 in. from step to step or step to platform, and 8 in. from platform to car floor. Shorter dimensions should be adopted wherever possible. Platform and car floor should preferably be on the same level on cars operating in all classes of ser-

vice. Steps should be of the folding type in all cases, except, possibly, for interurban service.

1d.—*Doors.*—Doors should be of the folding type, preferably manually operated. In the case of suburban service particularly, bulkhead doors and the bulkhead itself should be eliminated.

CHARACTER OF PLATFORM EMPLOYEES

2a.—*Disposition of Employees.*—One good-natured, even-tempered platform man, using good judgment, can accomplish more in the matters under consideration than a dozen men of other types.

2b.—*Age.*—Young men, and also many men of middle age, are best adapted for most efficient service.

2c.—*Training.*—Much can be accomplished in the proper training of employees in habits of courtesy, exercise of good judgment, etc., who without such training would be totally unfitted for the job.

DISTRIBUTION OF TRAFFIC EMPLOYEES

3a.—*Transfer Points.*—Inspectors should be stationed during periods of heavy traffic at all heavy transfer intersections. Their primary duty at such localities should be to facilitate and regulate the loading of cars and the dispatching of the same.

3b.—*Other Heavy Loading Points.*—Inspectors or other traffic men should also be located, during periods of heavy traffic, at all points of heavy loading other than transfer intersections. Their duties should be the same as mentioned in 3a.

3c.—*Disposition of Traffic Employees.*—Inspectors and other traffic employees should be men of good judgment and even disposition. They should be selected from among such platform men as have proved themselves most efficient in handling passengers.

EDUCATION OF PUBLIC

4a.—*Advertising in the Cars.*—Notices posted prominently and attractively in the cars requesting passengers to "Leave by the Front Door," "Move Up Forward," "Step Lively," "Put Yourself in the Other Fellow's Place," etc., materially aid in accomplishing the objects desired.

4b.—*General Publicity.*—Periodical publicity campaigns carried on through the local newspapers and other advertising mediums invariably bring about good results. Such notices or advertisements should be carefully worded and should demonstrate the many methods whereby patrons of the road may aid in promoting speed, safety and comfort of themselves, as well as of their fellow travelers.

GENERAL CONCLUSIONS

It is, of course, realized that all of the herein mentioned suggestions are not practically applicable in their entirety in all cases, or possibly in any one case, especially in the present period of abnormal conditions. These suggestions are submitted, however, as approaching what are believed to be ideal conditions for accomplishing the results desired. Any step in the directions suggested which has not been already adopted will be a further approach to the ideal conditions as set forth.

H. C. EDDY,

Senior Inspector of Traffic, Board of Public Utility Commissioners, State of New Jersey.

Council of National Defense Issues Extensive Report

More Than 400 Persons Were Engaged Continuously During the Past Year in This Work which Is Elaborately Organized

IN INTRODUCING a report of its work from inception to the end of the fiscal year closing June 30, 1917, Director W. S. Gifford of the Council of National Defense outlines the scope and purposes of the work of the Council. He states that the effort has been to make available to the United States the best thought and effort of American industrial and professional life for the successful prosecution of the war. The organization of the Council has endeavored to hold itself in readiness to meet new demands caused by the swift changes in strategy and rapid improvement in war machinery.

The several fields covered by the Council's work have been as follows:

1. Supervising co-ordination of purchases for the executive departments of the government, including the development of new sources of supply for both raw materials and finished products.
2. Standardization of specifications for tools and implements used in the manufacture of munitions.
3. Co-operative organization of transportation and electric communication for war service.
4. Inauguration with the government departments of an aircraft program and assistance in rendering this program an industrial possibility.
5. Organization for war of the medical profession.
6. Conducting a campaign to assist commercial business in meeting the demands made upon it by the war, and aiding establishments to make available for the needs of the government men, supplies, and equipments without impairing the essential service of trade and without imposing unnecessary hardship upon the people at large.
7. Development and stimulation of motor transportation facilities for government use.
8. Organization for common counsel of the leaders of the American labor movement, joined with representative employers and persons prominent in civic and industrial life, for the effective enlistment of the labor forces of the country for the conduct of the war.
9. Bringing together and concentration on war work of the engineering and educational professions, including the promotion of scientific research for the benefit of the national defense.
10. Effective centralization and direction of the efforts of American women on assistance in the conduct of the war.
11. Organization of the coal industry for more effective production and distribution of fuel.
12. Centralized direction of the activities of the several states in their effort to aid in war.

At the end of the fiscal year, the report states, there were 408 persons engaged on continuous work for the Council. Of this number 168 were receiving compensation and most of these were clerks and stenographers. This summary does not take into account the large number of additional volunteers who were devoting part of their time to the Council's work, whether in Washington or elsewhere.

Coal Shortage and Electric Railway Service

There Was No Material Change in Conditions During the Past Week—They Are Still Critical in All Sections

ALTHOUGH the United States Geological Survey reports a recovery from the recent "slump" in soft coal production, there is no evidence of adequate increase in production. December was the leanest month since April. The production was at the annual rate of about 545,000,000 tons, an increase of 8.3 per cent over 1916.

LIGHTLESS NIGHTS SAVE COAL FOR KANSAS CITY RAILWAYS

After a few days of mild weather at Kansas City, returning cold put gas usage out of the question. The new year found consumers using unusual means to economize in the use of coal to enable the Kansas City Railways to keep street-car service as nearly normal as possible and at the same time furnish a normal supply of current to the Kansas City Light & Power Company for distribution to homes and industries.

The advent of lightless nights makes an estimated saving of 150 tons of coal per week for the railway company. However, officials of the lighting company say that the success of the lightless nights depends more upon the patriotism of the average citizen than upon the big industries. More strenuous methods must be used, it is believed, to cause smaller consumers to economize on lights during the fuel shortage.

A propaganda is being started by Missouri officials to cause consumers of coal to purchase early next spring for use the following winter. State Fuel Administrator Crossley was in Kansas City on Dec. 30 for the purpose of instigating such co-operation on the part of consumers to guard against a repetition of this winter's crisis.

OHIO UTILITIES IN BETTER CONDITION

While electric-railway operation was far from normal in Ohio last week the actual danger of suspension had passed for the time because of the arrival of fuel sufficient to last until further expected shipments can be received.

It is hoped that the pooling plan devised by the coal operators, and the supervision of railroads by the government, will have the effect of furnishing a steady, if not a plentiful, supply hereafter.

Normal street-car, power and light service at Columbus depends in part on the transportation of coal from a mine in West Virginia in which the Columbus Railway, Power & Light Company purchased an interest last fall. Its contract provided for half of the output of 1500 tons daily, which should have increased the company's coal protection by 500 per cent for the winter. The government, however, commandeered the output for Eastern shipment early in the winter, and the company was left to do the best it could. This coal is now available, and the supply depends only upon the ability of the railroads to haul it. The company owns rights in slack piles in the Hocking Valley district, but transportation facilities are just as bad there. At present it is receiving a supply from day to day.

CONSTRUCTION, MAINTENANCE AND EQUIPMENT

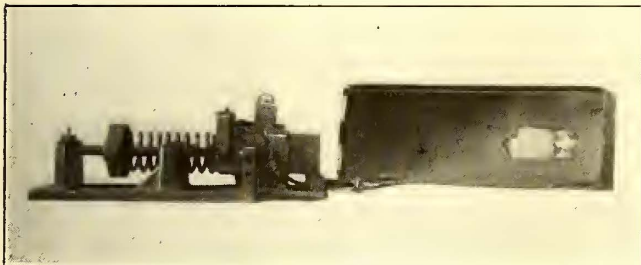
ENGINEERS, MASTER MECHANICS AND OTHERS WHO HAVE DEVELOPED ECONOMICAL PRACTICES, OR WHO HAVE WORTH-WHILE IDEAS ARE INVITED TO TELL READERS OF THE JOURNAL ABOUT THEM IN THIS DEPARTMENT

Decreasing Governor Maintenance

BY JAMES W. BROWN

Superintendent of Shops Wilkes-Barre & Hazleton Railway,
West Hazleton, Pa.

THE accompanying illustration shows a Westinghouse G.I.A. governor changed from a double to a single contact. This company has ten equipments of G.I.A. governors, now twelve years old. Up to five years ago we had a great deal of trouble with this governor due to the contacts burning off, the average length of time in service being about three months. They run now from



GOVERNOR CHANGED FROM DOUBLE TO SINGLE CONTACT

shopping to shopping, which means from eighteen to twenty-four months, and during the time since the change we have had no failures. This change was brought about by our air-brake inspector, Dave Kauffman. We put a long sliding contact on the coil side of the governor. This contact is a piece of tobin bronze $3\frac{3}{4}$ in. long, $\frac{3}{4}$ in. wide and $\frac{1}{4}$ in. thick, with about 3-lb. tension on the contact and only charged when the governor cuts in.

We made a sliding contact out of tobin bronze on account of its superiority over copper, as we found that two sliding contacts of copper do not wear smooth and soon cut, resulting in a sluggish governor, whereas tobin bronze with a copper contact sliding on it wears very smooth.

Empire State Shop Notes

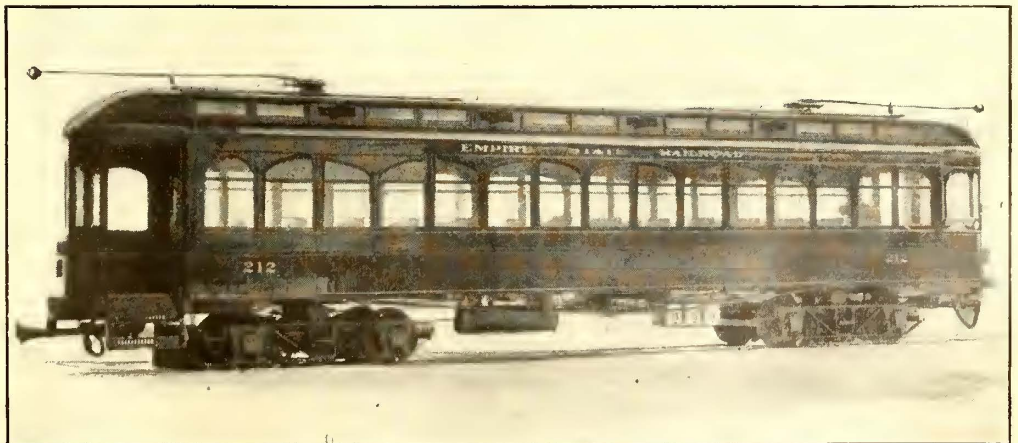
Large Interurban Car Remodeling Job Just Completed—Sheet Steel Pilot a Feature

WHEN J. C. Nelson took over the general management of the recently organized Empire State Railroad Corporation, a part of the former Beebe system centering at Syracuse, N. Y., he was in doubt as to the extent to which the federal government would require transportation for soldiers between points on the system and the temporary encampment located near the company's shops at Lake Shore Junction. Therefore, to be safe he decided to remodel six long interurban trail cars, built originally for summer traffic, by making motor cars of them and inclosing them for winter service. This job has been going through the Lakeland shops during the fall and early winter under the direction of A. B. Metcalfe, master mechanic, and the cars are now giving excellent service on short runs on the line between Syracuse and Oswego.

The cars formerly had low side sheathing with correspondingly deep windows. The sheathing has now been brought up to standard height, the line of the original sheathing and the added height being clearly discernible in the accompanying photograph of the complete car.

In accordance with the new color standards adopted by the company these cars have been painted a Pennsylvania Railroad red and varnished. They are striped in black and lettered in gold.

The bodies are mounted on light trucks, equipped with four 40-hp. Westinghouse 101-B motors, gear ratio 22 to 62. This power is ample, as the line is practically level. The truck frame carries a special sheet-steel pilot made in the company's shops. This weighs 150 lb. and is of No. 10 gage sheet. The pilot forms an excellent snowplow as well. As it is attached to the truck frame rather than the car body, its motion with



FRONT OF EMPIRE STATE REMODELED CAR, SHOWING CLASSIFICATION BULL'S EYES, AND LONG TRAIL CAR TRANSFORMED INTO INTERURBAN MOTOR CAR

Experiences with Interurban Car Axles

The Author Gives the Results of Experiments with Several Kinds of Steel—Wheel Fit Was Increased from 6 In. to 7 In. with Good Results

BY A. B. METCALFE

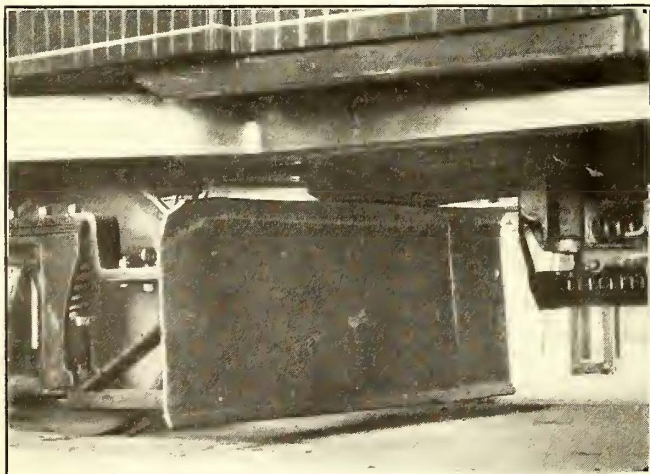
Master Mechanic Empire State Railroad Corporation, Syracuse, N. Y.

[NOTE.—In view of the present interest in improving the quality of car axles and knowing that the mechanical department of the former Beebe Lines had made extensive studies of the subject as related to interurban car operation, we asked Mr. Metcalfe, formerly connected with the Beebe System, to give our readers a brief summary of his observations. This article is the result.—EDITORS.]

ON the lines of the Beebe System, of which this railway formerly was a part, we tried out a number of different grades of material for car axles, with varying results. Until the last year or two all of our axle defects occurred at a point between the hub of the gear and the hub of the wheel on the gear end of the axle. On our equipments the gear was mounted close to the wheel. Recently, however, we have had some failures at a different part of the axle, namely, on the motor axle bearing seat. We have not as yet been able to determine the cause of this. At one time we thought that it was due to hot motor axle bearings, but we have had at least one case of breakage at this point without previously having had any hot axle bearings. Curiously enough, this occurred on a hard vanadium steel axle.

At one time we had about come to the conclusion that

(Concluded from page 93)



SHEET STEEL PILOT AND SNOW PLOW

respect to the track is very small, hence it can be set quite close to the track.

For classification markers on these cars two bull's-eyes are set into the letterboard just under the vestibule hood and lighted through colored glass slides. Between the lamp and the lens is a frame in which is a two-color slide by means of which the color can be changed very quickly.

These cars weigh, equipped, about 56,000 lb., and the seating capacity is sixty. The rattan-covered cross seats give the interior the appearance of an unusually long city car. There is no separation into general and smoking compartments.

mounting the axle gear on an extension of the wheel hub was the solution of the breakage problem, but this scheme proved to be impracticable in the case of rolled steel wheels on account of the expense of making the wheels. To test out the matter, however, we purchased some chrome nickel sleeves, on which the wheel and gear were pressed, and the sleeve was then pressed onto the axle. Bearing was provided, however, only for the length of the wheel hub, the sleeve being counterbored about 1/16 in. larger than the axle, under the gear. The idea was that the point of greatest stress in the axle would be inside the sleeve, and in the case of a break in service the longer piece of the axle holding the motor could not drop down because it would project 6 in. or more into the sleeve.

To prove that the use of this sleeve removed the danger resulting from an axle breaking in service, we cut an old axle into two pieces, the cut being about where they nearly always broke, and mounted the sleeve, gear and wheel on the short end. We ran a car equipped with this axle all around the shop tracks, curves and switches, and out on the road, the only indication that the axle was in two pieces being that on a quick acceleration the end on which the gear was mounted would spin, while the other end moved only as fast as the car. These sleeves are still in service and have given very high mileage, but the shop operations involved in applying them made their extensive use, we thought, impracticable. The sleeves, also, were expensive to make. One fine feature about them, however, was that we were never afraid to operate the axles fitted with these sleeves. Later to reinforce the axle at the weak point we increased the diameter of the wheel fit from 6 in. to 7 in. As the gear seat was originally 7 in., this made the axle 7 in. in diameter at the point where practically all the cracks had developed. None of the axles which have a 7-in. diameter wheel and gear fit has developed cracks at this point, which tends to prove that the previous axles were weak here. Cracks developed at the other end close to and inside the wheel hub.

When we first started operation the cars were equipped with open-hearth untreated steel axles, most of which developed cracks in the first 250,000 miles, but others are still in service. Some of these have made between 600,000 and 700,000 miles. Next we got some heat-treated carbon steel axles, but these were found at first to be too hard and gave trouble in less than 100,000 miles. Lower carbon steel was procured and has given very good service. We tried some low carbon and nickel steel axles, specially treated. These were very soft and the elastic limit low, and they gave very low mileage before developing defects requiring them to be discarded. The axles which have given the best results are of vanadium steel, with wheel and gear fit 1 in. larger in diameter than the main body of the axle.

Our method of inspection is to take a very fine cut with a sharp lathe tool over the section where the crack is liable to develop, and if the axle has the least crack in it the operator can see it with a naked eye. We had scrapped more than 200 axles from fifty cars in the last seven years. All of the cracks were discovered in the above-mentioned method of inspection. The cracks have varied in depth from 3/32 in. to 7/8 in. We believe that a test piece should be taken from each end of each axle made, and that a report of a test made by the manufacturer should be furnished to the customer.

Determining Stray Power of a Transmission Line

The Author Presents Data Taken in a Test on a 115-Mile Railway Transmission Line in the Middle West

BY D. D. EWING

Associate Professor of Electric Railway Engineering, Purdue University, Lafayette, Ind.

THE data presented in this article were taken in a test made under the writer's direction for the purpose of studying the operating conditions existing on the transmission line of the Fort Wayne & Northern Indiana Traction Company. This line extends from Fort Wayne to Lafayette, Ind., a distance of 115.4 miles, measured along the line. It connects the power plants of the company located at the two places. The system is three phase, with a line-to-line voltage of 33,000 and a frequency of 25 cycles. The line consists of three No. 2 B. & S., hard-drawn copper wires, arranged to form an equilateral triangle, and with a spacing which varies from 36 in. to 72 in. The average spacing was estimated to be 60 in. The wires are supported on pin insulators mounted on wood poles spaced 100 ft. apart. Some of the crossarms are of wood and some are of steel, the former predominating. Air-break sectionalizing switches are located at each of the ten railway sub-

TABLE GIVING LENGTHS OF LINE SECTIONS

Section	Length, Miles	Total Distance, Miles
1	9.50	9.50
2	8.71	18.21
3	10.66	28.87
4	11.03	39.90
5	11.28	51.18
6	12.52	63.70
7	11.56	75.26
8	14.12	89.38
9	8.82	98.20
10	17.20	115.40

stations. The lengths of the several sections between substations, starting at the Lafayette end, are as given in the accompanying table.

In the Lafayette station the high-tension lines are connected to the 370-volt buses through three step-up transformers having an aggregate capacity of 1125 kva., connected delta-delta. The measured ratio of transformation was 88.8. At Fort Wayne the transforming apparatus consists of two banks of transformers connected in parallel, each bank being of the same rating as those at Lafayette.

The measuring instruments were connected in on the low-tension side of the step-up transformers at the Lafayette power house. Power was measured by the two-wattmeter method. Voltage readings were taken for all three phases, and the current in two lines was measured.

Preparatory to making the test all transformers were disconnected and the line was sectionalized. With the step-up transformers at the Lafayette station connected to the busbars, readings were taken of power, current and voltage. The first section of the line was then connected to the high-tension side of the transformers, and readings were again taken. This process was repeated by connecting on section after section until the end of the line was reached. During the test the voltage at the generating station was maintained as nearly as possible at 370 volts.

The amperes per line, corrected and adjusted to 370 volts, are recorded in Fig. 1. The figure gives the

graphical average of the currents in the two lines in which meters were placed. The current shown by the graph as corresponding to a certain distance from the power station is not the current in the line at that point, but is the current input to a line of length indicated by the abscissa of the point. The current at zero length is the exciting current of the step-up transformers. The numerical value of this current is 68.3 amp., and, of course, has a large lagging component. As the sections of the line were connected on successively, the

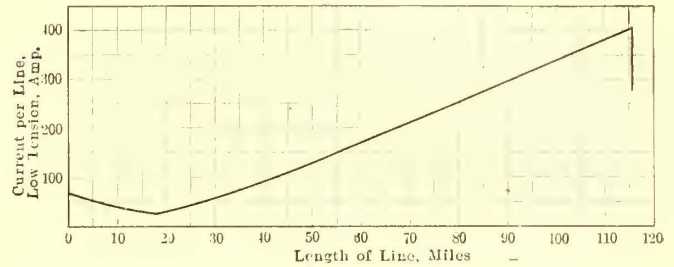


FIG. 1—RELATION BETWEEN LINE CURRENT AND LENGTH OF LINE

leading current—due to the electrostatic capacity of the line—neutralized the lagging component until a line length was reached at which the power factor was unity. Beyond this point the current input increased rather rapidly, the power factor with the last section connected being 10.4 per cent leading. The drop shown at the end of the graph was occasioned by the exciting current of the Fort Wayne transformers when they were connected to the line with their low-tension windings on an open circuit.

The power readings, corrected for scale errors and phase-angle displacements, and adjusted to 370 volts, when plotted gave the straight line AC in Fig. 2. On the basis of constant loss in the step-up transformers the intercepts between the lines AC and AB are the leakage losses of lines corresponding in length to the abscissas at which the intercepts were taken. The input indicated by the point A is the no-load loss of the Lafayette transformers. At first thought it might seem that the line CD would represent the corresponding no-load

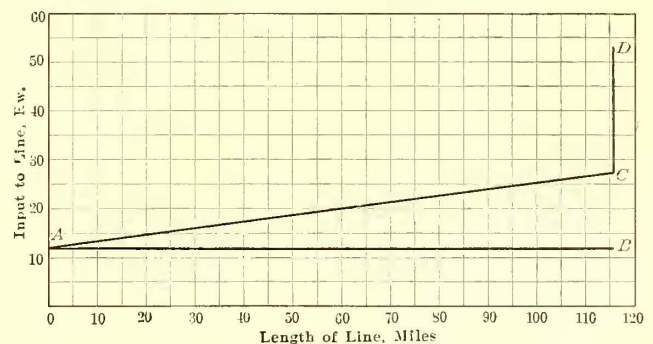


FIG. 2—RELATION BETWEEN POWER INPUT TO OPEN-ENDED LINE AND LINE LENGTH

input to the Fort Wayne transformers. It will be shown later, however, that this is not quite correct.

The assumption of constant transformer loss in drawing the line AB is not much in error, since any increase in losses must be due to copper losses. These, even with the whole line connected, will not be great, as the charging current of the line is only about 25 per cent of the current rating of the transformers. In this case the increase would be of the order of 0.6 kw.

The actual charging current for different lengths of

line can be found by subtracting vectorially the exciting current of the transformers from the current input to a given length of line. The graphical solution of this problem is illustrated by the vector diagram, Fig. 3. The vector *OO* is the exciting current of the transformers, and *O1*, *O2*, etc., are the current vector for lines of the several lengths. The vector differences between these vectors, *O1*, *O2*, etc., are the charging currents for the different lengths of line referred to the vector for the voltage of the Lafayette station. The horizontal projections of these vectors, *O'1'*, *O'2'*, etc., are the quadrature

as 0.864 ohm per mile. Using this resistance and the actual currents in the high-tension line for different line lengths, the ordinates for the copper-loss curve in Fig. 5 were computed. Subtracting this loss for a given line length from the corresponding intercept in Fig. 2 gave as remainder the line leakage loss for the given length of line. These losses were plotted to give the leakage-loss curve, Fig. 5, which represents the average of 0.106 kw. per mile for the entire line. This loss obviously is independent of any load on the line.

The copper losses in the line are not the same with

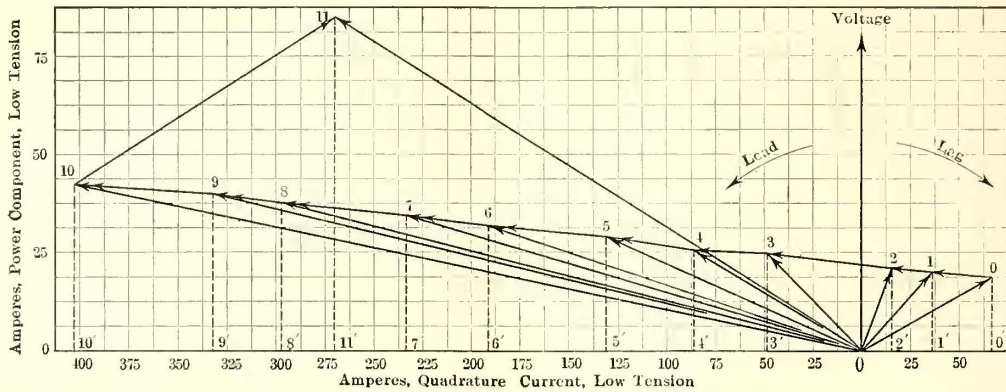


FIG. 3—VECTOR DIAGRAM FOR DETERMINING THE CHARGING CURRENT OF THE LINE

components of current for the several lengths. Vector *O-11* represents the current input with the Fort Wayne transformers connected, and a line drawn from 0 to 10 would be the vector for the current in the transmission line at Lafayette, expressed in terms of the low-tension current.

The actual charging currents, quadrature components, for different lengths of line are shown by dots in Fig. 4. For comparison, the upper line, giving the theoretical values, was drawn. Data for establishing this line were calculated from the standard formulas for line capacity, using the average spacing of 60 in. The theoretical value for the capacity current is 0.0437 amp. per mile of line. The lower line in the figure, which was drawn

the line open-ended and with it closed on transformers. The quadrature current distribution along the line for the two conditions is illustrated in Fig. 6. With the line open-ended, the distribution, at least for the case in hand, will be very nearly as shown by the line *AB*; that is, at the station end the current will be a maximum, and will shade down to zero at the farther end of the line. With the farther end closed on transformers, however, a different condition prevails. The quadrature component of the exciting current of these transformers is represented by the distance *10'-11'*, Fig. 3, and has a calculated value of 132 amp. Transferred to high-tension terms, its value is 1.48 amp. To neutralize this lagging current requires 1.48 divided by 0.0437, or

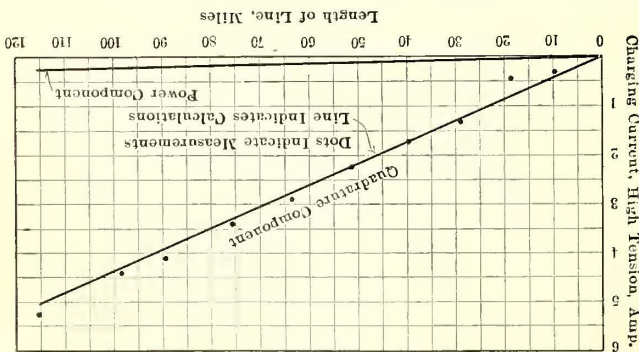


FIG. 4—COMPARISON BETWEEN ACTUAL AND CALCULATED CHARGING CURRENTS

through most of the points plotted, represents the actual power component. The actual line currents, of course, would be found by adding the two components at right angles. As a matter of fact, however, the power components are so small that the actual currents do not differ greatly from those indicated by the upper line in the figure.

The resistance of No. 2 B. & S. hard-drawn copper at ordinary temperatures is given by wire manufacturers

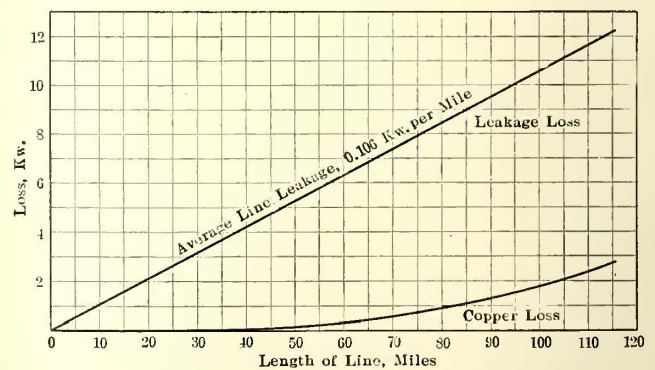


FIG. 5—SEGREGATION OF NO-LOAD LINE LOSSES

34 miles of line. This will result in a quadrature current distribution for the second case as indicated by the line *CDE*, Fig. 6. Therefore, the only current in the line at a distance of 81.4 miles from the station, is the power component necessary to supply the leakage and copper losses of the last 34 miles of line, plus the no-load losses of the transformers. This would be about 1/2 amp.

For the entire line the copper loss calculated for the

first case is 2.75 kw., as shown in Fig. 5. With the distribution of current as in the second case the loss is only 1.06 kw. This decrease in copper loss means that the no-load losses of the Fort Wayne transformers, instead of being 26.4 kw., as indicated by the line *CD*, Fig. 2, are really 1.69 kw. (2.75 kw. minus 1.06 kw.) higher than this, giving a total of 28.1 kw. A check test made from the Fort Wayne end of the line gave results agreeing very closely with this figure.

As a matter of interest, it may be stated that with all substation transformers connected to the line, sec-

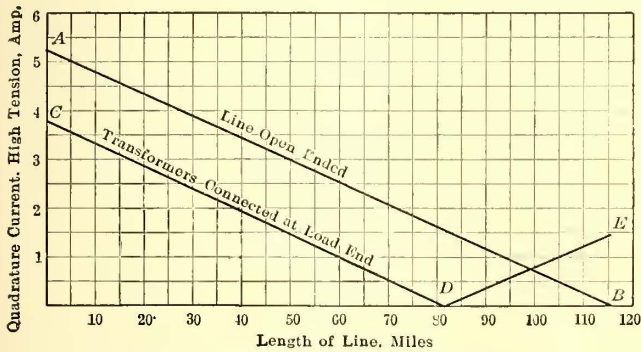


FIG. 6—DIAGRAM SHOWING QUADRATURE CURRENT IN THE LINE AT DIFFERENT POINTS

ondaries open, the input to the line was 90.3 kw. with a leading power factor of 0.90.

The author wishes to acknowledge his indebtedness to the Fort Wayne & Northern Indiana Traction Company, whose courtesy permitted the test, and to L. H. Junken, C. N. Iry, E. Pugh, and A. V. Stout, from whose graduation theses the data for the above curves were abstracted.

Coasting at Chicago

SINCE coasting recorders have been installed on the Chicago Elevated Railway, the *Safety Bulletin* published by that company states that records of power consumption show steadily increasing efficiency of the motormen. Some of the most efficient of the men say that they have found it easier to maintain schedule speed although they have coasted more.

One interesting fact brought out at Chicago is that the responsibility for wasted electrical energy should not be entirely placed upon the motorman, as he cannot keep up his schedule without the co-operation of the rest of the train crew. This was proved when a motorman who was found to be very efficient made a remarkably poor showing on a certain day and complained that the fault was due to the conductor, who kept the train tied up at the stations. A conductor who was young and full of "pep" was put on the following day and the coasting time of the motorman was greatly increased.

The coasting records taken on various lines, covering a period of one week, show a percentage of coasting ranging between 33 and 36.4 and a saving of power of 10.6 per cent. The coasting records of individual motormen show variations of 25 to 48 per cent. With a little more experience, this wide margin is expected to be cut down materially. These records are, of course, inconclusive, due to the short time that the recorders have been in service, but the Elevated officials are confident that the recorders will do all that was claimed for them.

Effects of Arc on Metal In and Around Electric Weld

BY O. A. KENYON

Electrical Engineer Arc Welding Machine Company, Inc.,
New York City

THE writer was very much interested in tests reported in the issue of the *ELECTRIC RAILWAY JOURNAL* for Dec. 22, made at the works of the Westinghouse Company at East Pittsburgh, tending to show the effect of the arc on material adjacent to the weld.

Although I have taken an active interest in effects of this kind for a number of years, I was not aware that there was any belief current to the effect that material adjacent to the weld was injured by an arc of 60 volts. It is, however, generally admitted that it is possible to injure material that is deposited in the weld with an arc of 60 volts.

The effect of an arc upon the material adjacent to the weld is dependent upon all factors which determine the temperature of the metal at that point and the length of time that the metal is maintained at a high temperature.

Arcs connected in series with reactance produce a tremendous temperature rise at the moment of breaking the circuit, and it is arcs of this kind which possess the power to injure metal by the mere striking and breaking of the arc. It would be interesting to continue the investigations in series with which a reactor is connected, and also to include pieces in which the metal deposited in the weld is part of the test piece.

Undoubtedly metal deposited on the solid plate in the form of a patch changes the structure of the steel, as was evidenced by the decrease in elongation and reduction of area, as well as the increase in tensile strength. The writer has used this method for local heat treatment of welded joints, that is, by depositing a layer of metal on top of the weld after it is completed and then machining it off, with the result that the weld is stronger and the contraction stresses are practically eliminated.

Commissioners Indorse Fuel Saving but Take Little Formal Action

The various public service commissions of this country are standing ready to co-operate with the government in the saving of fuel, as far as they can be of any assistance. Only a few boards, however, have as yet taken any formal action in this matter. These facts have been brought out by a canvass, begun by the *ELECTRIC RAILWAY JOURNAL* immediately after Dr. Garfield as United States Fuel Administrator asked the commissions and electric railways to aid in eliminating wasteful uses of electricity. Previous articles, describing formal action taken by the Massachusetts, New Jersey and New York First District commissions appeared in the issues of Dec. 8 and Dec. 15.

In arranging a service flag to be hung in front of its place of business, the Kansas City (Mo.) Railway was confronted with the problem of providing a flag large enough to display properly the 200 stars that will appear in the center white field. By the time the flag is completed there will be approximately 212 stars, as that many men from the electric railways will be enrolled in the service of the government.

Basalt Blocks Make Good Headers in San Francisco

SEVERAL kinds of header blocks have been used on the San Francisco systems, but the United Railroads has chosen the basalt blocks as far superior to others and now uses them exclusively on all parts of the system. Basalt is quarried from the basaltic dikes of California. The four common varieties are gray, blue, brown and porous. The latter is not well suited for headers, and of the others, that having a blue color is the best. This stone if subjected to heavy truck traffic will develop occasional breaks in ten years, but the ultimate life is usually fifteen years. The basalt blocks now cost about \$55 per thousand.

The United Railroads has effected some saving where it was necessary to reconstruct the paving between rails in basalt block pavement. These blocks were replaced with asphalt pavement and the blocks were cut up into two or even three pieces suitable for headers at a cost of about \$10 to \$12 per thousand.

Brick headers have been extensively used in San Francisco, but under heavy traffic they break down quickly. On a thoroughfare where traffic is light an exceptionally good quality of brick put down in 1909 is still in service. Brick from the same source, however, and supposed to be of equal quality, which was put down later, has not given long life under any conditions and under heavy traffic is not expected to have a life of more than a few years. The paving brick available in San Francisco vary in price from local grades costing \$25 to \$30, up to \$46 to \$50 for the best grade shipped in from Puget Sound. The latter grade has been used extensively by the Municipal Railway and is considered satisfactory in residence districts or where the traffic is light.

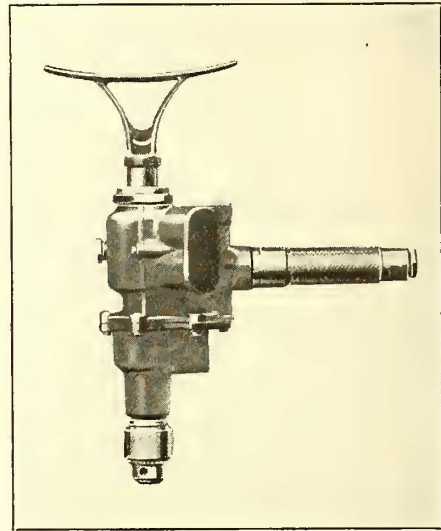
For a while Ohio wood from the Hawaiian Islands was used for headers. This is a very heavy wood with a very low absorption capacity and which will not buckle due to expansion. It therefore requires no creosote or other similar treatment. At one of the crossings where the traffic is very heavy, these blocks have been in service three years and show practically no wear. The Ohio blocks cost only \$25 per thousand, while they were available, and they were rated as the best material for headers. The manufacture of the blocks was discontinued, however, because other markets for the wood were found which offered greater profits. If other hardwoods could be procured from the tropics when facilities for water shipment are on a normal basis again, Pacific Coast electric railway operators would doubtless be much interested in their production.

Granite header blocks have been used to some extent and the California granite is regarded as wearing much better than brick but probably not as long as the best basalt. In removing the old granite wall from the site of the former City Hall it was decided to cut the stone up into header block sizes for the Municipal Railway. This is being done by stone masons entirely by hand work, at a cost of \$37.50 per thousand. About 50,000 are being made in this way.

The maximum load in the history of the Commonwealth Edison Company of Chicago occurred at 5 p.m. on Dec. 28 when the meters registered 410,910 kw.

A New "Little David" Drill for Light Work

THE Ingersoll-Rand Company has added to its line of "Little David" pneumatic tools a new lightweight, high-power, non-reversible drill especially adapted to that class of drilling and reaming work which may come within its capacity limits of reaming up to 5/16 in. and drilling up to 9/16 in. This new drill has been designated No. 5 "Little David." It weighs 15 lb. and develops a free spindle speed of 1000 r.p.m. With drill chuck its over-all length is 14⁵/₈ in. and the distance from the side of the drill to center of spindle is but 1¹/₂ in., which facilitates its operation in unhandy places. The spindle is threaded to accommo-



"LITTLE DAVID" PNEUMATIC DRILL FOR LIGHT WORK

date either a No. 1 M.T. socket or drill chuck, and these may be readily interchanged as desired.

The four-piston motor is very simple and the convenient accessibility of the reciprocating parts is pointed out to be of advantage. It is stated that the removal of five cap screws permits the crankshaft assembly to be withdrawn in its entirety. The valve is of the rotary type and is gear driven. Roller bearings are used on the connecting-rods and ball bearings on the crankshaft. The No. 5 "Little David" may be had with either breast plate spade handle or telescoping feed screw. In the latter case the length of feed measures

Twenty Sources of Fuel Waste

ATTRACTIVE posters emphasizing the necessity for saving fuel are being sent each week to all the Doherty properties. A very effective one pointed out the following potential sources of power waste:

1. Too many boilers in service.
2. Holes in the fire.
3. Fires too heavy.
4. Improperly banked boilers.
5. Too much fuel in the ashes.
6. Failure to operate boiler dampers.
7. Irregular steam pressure.
8. Safety valves blowing.
9. Air leaks in the boiler settings.
10. Scale in the tubes.
11. Soot on the tubes.
12. Leaky baffles.
13. Stokers or grates out of repair.
14. Leaky blow-off valves.
15. Steam leaks of any kind.
16. Dirty feed-water heater.
17. Bare steam pipes.
18. Low vacuum.
19. Turbine blading worn.
20. A dirty plant causes fuel waste.

Mechanical Problems in Design of Electric Locomotives

Tracking Qualities—Transmission of Power from Motor to Rail—Design of Motors—Further Development Possible

THE service requirements for steam and electric locomotives are very similar, so that many of the structural problems are common to both designs. There are, however, many problems which are quite dissimilar, due to the fact that electric instead of thermal energy is utilized in the electric locomotives. These points are well covered in an article by W. K. McAfee appearing in the January issue of the *Electric Journal*.

The mechanical problems in the design of the main structures and rotating parts of electric locomotives may be divided into the problems relative to tracking qualities, to the transmission of power from the motors to the rails and to the design of the motors themselves.

The tracking qualities depend upon the position and weight of the motors, the positions of the center of gravity in the vertical and horizontal planes, and the weight transfer. The position of the motor determines the type of drive, and this in turn largely determines the size, number and speed of the motors. A low center of gravity often makes a cheaper locomotive, but better running qualities are secured by a relatively high center of gravity. The important factor concerning the horizontal center of gravity is such disposition of masses with reference to center pins as to eliminate the tendency to swing at high speeds, causing distortion of track and possible derailment. The weight on the rear drivers is increased and that on the front drivers decreased when drawbar pull is exerted, but the tendency of the front wheels to slip is reduced by side rods. In the case of axle mounted motors the dead weight may produce undue stresses in the track structure, but articulated trucks eliminate part of this weight by transmitting it from truck to truck.

Relative to the transmission of power from motors to the rails, solid gear drive with axle suspended motors is used on street and interurban cars. The flexible gear is one of the most important for heavy service, as shocks due to sudden starting and track irregularities are eliminated. The quill type of drive is one solution for mounting motors on the trucks, as with this type vertical motion is permitted between motors and driving axles. Tracking qualities are bettered by mounting the motor higher and connecting to the driver by side rods, many different types of which have been developed.

One of the most important problems in the design of motors is the bearings. As the space taken by the bearings reduces the motor length and the output the most economical compromise is to concede enough length to the bearings to permit them to transmit the maximum power that the motor can economically deliver with the resulting length of core. Regenerative braking introduces another problem, as the bearing pressure is reversed without reversing the direction of rotation of motor. The main motor shafts must be capable of resisting strain due to sudden stopping or severe overload when the motors are directly connected to the drivers by means of side bars alone. If desired, yield may be introduced between the motor rotor and the

crank on the motor shaft by springs or by a friction clutch. Braces must be designed to withstand heavy stresses due to occasional short-circuit, and castings must fulfill all electrical and mechanical requirements and at the same time not be excessive in cost of pattern and molds. Forced ventilation of motors is becoming more generally used in cooling, the goal being to get maximum cooling with minimum of air, and maximum of air with minimum of power from the blower motor.

There is still an important field for development in the design of electric locomotives, one problem being to increase the drawbar pull without making an abnormally long locomotive.

Gasoline Rail Car de Luxe

THE accompanying photograph shows a very attractive gasoline rail car which has just been completed and is being used for demonstration purposes in the Sacramento Valley, California.

The car is all steel, built with the outside finish ribbed to resemble wood. Its weight is 14,000 lb., its length over all is 40 ft., its outside width is 7 ft. 6 in., and it has a passenger capacity of thirty-one. The arrangement of the floor plan, from front to rear end, is as follows: engine room, baggage room, smoking



GASOLINE CAR IN SACRAMENTO VALLEY, CALIFORNIA

room, entrance gates and vestibule on each side with lavatories in the center, parlor section with individual chairs and separated by full glass partition from observation platform at extreme rear end. The finish in white enamel with brown trimmings gives the car a de luxe appearance, so that it has attracted considerable attention. Electric starting and complete lighting current at 12 volts is supplied.

This car was built by the Commercial Cars Construction Company, San Francisco, Cal. The car has not as yet been in operation long enough to determine the operating cost data.

Good Record for Armature Bearings

The International Railway, Buffalo, N. Y., has been experimenting with a bronze armature bearing cast from a formula original with George Kuhn, master mechanic, which has given excellent results. At last report the bearing had made considerably more than 104,000 miles. It has been installed on four GE-74 motors, gear ratio 33 to 56. The motors are on an interurban car running on the high-speed line between Buffalo and Lockport. The company usually gets from 25,000 to 30,000 miles with a babbitted bearing.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

Broadway Subway Opened

Local Service by B. R. T. on Line Between Rector and Forty-second Streets, Backbone of System

On Jan. 5, at about noon, New York City celebrated the opening of another new rapid transit line, namely, the Broadway subway in Manhattan, for operation by the New York Municipal Railway Corporation. The new operation consists of local service between Rector Street on the south and Forty-second Street, or Times Square, on the north.

For some time past the Broadway subway has been in operation between Canal and Fourteenth Streets in connection with trains from the Sea Beach line in Brooklyn, the trains passing over the Manhattan Bridge and the Canal Street subway to the Broadway line. The new service extends the 5-cent zone for Brooklyn travelers northward from Fourteenth Street, therefore, to Times Square, but for a while it will be necessary to change cars at Fourteenth Street. Eventually all the tracks of the Broadway subway, which is a four-tracked line, will be placed in service, and then both local and express trains will traverse the whole length of the line.

HOW LINE WILL OPERATE FINALLY

When the line is placed in operation in its entirety it will run from the Battery northerly through Church Street, Broadway and Seventh Avenue to Fifty-ninth Street, thence easterly under Fifty-ninth Street and the East River to a connection with the new rapid transit lines in Queens Borough. On the southern end there will be a tunnel to Brooklyn connecting with the Fourth Avenue subway, and connection is also made with that line through Canal Street and over the Manhattan Bridge.

The construction of the Broadway subway, Manhattan, was first proposed in 1911 as a means of relieving transportation conditions in that section of Manhattan south of Fifty-ninth Street, and as a distributing line through the heart of Manhattan for the people of Brooklyn and Queens. The proposal was made by the Brooklyn Rapid Transit Company. Two full years of discussion and planning followed before an agreement was finally reached and the plan ratified. Construction was begun, however, before the contract was executed, and the city has been building the subway for about six years. Two tracks have been placed in operation between Whitehall Street and Forty-second Street. It will be some time before all four tracks will be ready for express and local service, and before connections will be made with Brooklyn

and Queens via the tunnels at the Battery and at Sixtieth Street respectively.

In a pamphlet which it prepared for distribution among its patrons the company said:

"For intermediate imperfections of service the operating company begs the indulgence of its patrons. The limitations at terminals will temporarily restrict the number of trains to be operated, and the other evidences of incompleteness will produce some complaint and inconvenience. But both the Public Service Commission and the operating company feel that it is better to begin operation with facilities as they are than to wait until the work is entirely finished."

Brooklyn subway trains now operated to Union Square via Manhattan Bridge and Canal Street will continue to be thus operated, but will use the express tracks between Canal Street and Union Square, with intervening stops. Change may be made there for local subway trains to Forty-second Street and vice versa.

Severe Storm in West

The severe blizzard which swept over the Central Western states on Sunday, Jan. 6, paralyzed street railway and interurban traffic. City service in Chicago was demoralized and hundreds of residents were compelled to remain in downtown hotels Sunday night because of their inability to get home. In the Calumet region conditions were worse than in Chicago proper. Pullman, Indiana Harbor, Gary and Hammond were left practically without railroad communication. In some cities of Illinois and Iowa electric railway and interurban systems were unable to move any cars after 5 p. m.

Hundreds of soldiers from Camp Grant, near Rockford, Ill., were caught in the city of Rockford and were unable to return to their cantonment. Finally about 150 of them appealed to W. C. Sparks, general manager of the Rockford City Traction Company, who ordered two interurban cars, equipped with snow sweepers, to make the trip to Camp Grant. More than two hours were required for this trip of about 5 miles. Joliet, Ill., was also hard hit by the storm and while city railway traffic was maintained, the interurban service in and out of Joliet was very infrequent. Plainfield, Ill., a village 10 miles north of Joliet, was completely isolated by the storm. Several cars were almost buried in the snow in a deep cut between Joliet and Plainfield. By Monday morning, Jan. 7, however, most of the railway companies were able to resume normal service.

State Directors Urged

Speaker Cox of Massachusetts House of Representatives Declares Against Public Ownership of Railways

Public ownership of electric railways was condemned by Speaker Channing Cox of the House of Representatives of Massachusetts in his inaugural address at the opening of the 1918 Legislative session. He impressed upon the House the necessity of action to relieve the electric railways of their financial burdens and argued strongly for "intelligent State supervision with State directors," as the solution of the present problem. The Speaker's reference to the electric railway situation was the most important feature of his address. In this connection he said:

"The people of the commonwealth are dependent upon the continuance of the electric railway systems. Our future prosperity, our comfort, our convenience, require not only a continuance but indeed an improvement of such service. One by one the electric railways are showing their inability to continue under present conditions. This is true of railways in cities and of those in rural communities. The money honestly invested in these railways represents in part the savings of the toilers. I hope that Massachusetts will always deserve a reputation of dealing honorably with those who have loaned their savings to build up our industries and to develop our commercial life, but the question is bigger and beyond fair treatment to investors. It is a question of continuance of railway service and development and improvement. The issue is between progress and something worse than stagnation—retrogression.

SOMETHING MUST BE DONE

"Obviously the Commonwealth could take over the electric railways, paying therefor a fair value, and then operate them. I have little doubt that the owners of stock in Massachusetts electric railways would welcome such a step. But I hope the day is far distant when Government ownership and operation of electric railways will be necessary in Massachusetts. I cannot believe that the most efficient and economical conduct of our electric railways lies in that direction.

SOLUTION NOT IMPOSSIBLE

"With strong and intelligent State supervision, with State directors, the cost of electric railway construction and operation plus a fair return on the honest capital invested can be determined. On that basis a proper and sufficient charge for service can be fixed by State authority. The public is

Views of Massachusetts Board

Chairman Macleod of Massachusetts Public Service Commission Questioned on Electric Railway Problems

Frederick J. Macleod, chairman of the Public Service Commission of Massachusetts, appeared recently before the legislative street railway investigating commission at Boston and submitted to an extended series of questions regarding the views of the board on the electric railway situation in general. Mr. Macleod said that there were companies where there was no reasonable outlook that the road could put itself in a sound financial condition by any fares which it was possible to impose. In other words, higher fares would discourage riding to a point where the net results might be less advantageous to the companies than the lower rates. Under such conditions the company ought to be permitted to abandon the service if it found that it was not earning operating expenses. On the other hand, if the communities affected believed that the service was of vital importance, some provision ought to be available by which part of the continued operation of the company should rest with the community served. He then cited the case of the Providence & Fall River Street Railway which would not stay abandoned.

ASSESSMENT MATTER ABANDONED

The question was raised whether the Massachusetts commission had ever considered the wisdom of assessing betterments on abutters where there were extensions of rapid transit lines. Mr. Macleod said the commission had suggested, in connection with the Boston Elevated investigation of a year ago, such a system, but that the subject was complex and that no detailed plan had been prepared. When Peter Witt appeared at the Bay State rate hearings before the board, representing the remonstrants in that case, he expressed himself very strongly in favor of the application of that principle, and in the city of Cleveland when certain communities were being built up and a certain number of real estate operators were very anxious to get street railway service extended into this new territory, Mr. Witt, as street railway commissioner of Cleveland, insisted upon securing special contributions from the real estate owners on those lines before they were put into operation.

Mr. Macleod said that the situation of Massachusetts electric railways reflected in general electric railway conditions all over the country, Repre-

sentative Hays asked Mr. Macleod whether he thought that it was a part of the duties of the commission if it saw a road going down financially to advocate higher fares. Mr. Macleod did not know whether the commission had the authority to do that under the law. The Interstate Commerce Commission did not have the authority to deal with the matter in that way. He said: "So far as the necessity of increase in fares is concerned, if it was just that larger and higher fares should be charged in order to provide proper service for the communities and to keep the electric railways going, in so far as I am personally concerned, I would have no hesitation whatever in saying that such increases were necessary in the general interest."

CARING FOR DEPRECIATION

The Massachusetts commission in certain fare cases had indicated that the company should provide depreciation on a scale that had been indicated. Under the form of the return which the commission had prescribed the company must report some reserve for depreciation on electric railway equipment, but there had been no requirement for larger depreciation reserve for maintenance of ways and structures, and the Massachusetts Board had followed practically the same course as the Interstate Commerce Commission in that respect, and had urged the company to lay aside and had required it to lay aside some reserve for depreciation. But the commission had not attempted to indicate any definite amount which ought to be set aside by any company. Laying aside a depreciation fund was possible only if the revenue of a company was sufficient. The question of rates and the question of laying aside a proper depreciation fund were inextricably bound together. The commission had ample power to handle this matter, in the opinion of the chairman, who said that if that power had not been exercised it was due to the fact that the commission as a matter of discretion did not believe that under the present financial condition of the companies it should attempt to make specific requirements for depreciation except in so far as the board was able to deal with companies in cases where increased fares were given.

IMPROVING RAILWAY CREDIT

The commission had attempted to make better credit for electric railways by taking action in giving the companies increases in fares to which they were entitled, by recommending the elimination or changing of certain forms of taxation and suggestions in regard to the regulations of jitneys.

The commission had reversed itself on the one-man car question, but considered itself in good company in that respect in view of the early lack of advocacy of this type of rolling stock dis-

played by Massachusetts companies. Chairman Macleod said that whereas the carmen's unions were opposed to the introduction of one-man cars at the outset, he thought that employees of operating companies now held a different view, having a better appreciation of the advantages of such cars to the employees themselves, as well as to the companies and the public. In the one-man car matter the commission gave very full and careful consideration to the objections raised by the employees and the commission believed that these objections were not controlling and permitted the companies to make the experiment.

Railway Hit

P. R. T. Protests Against Proposed Power Rate Increase of Philadelphia Electric Company

Ellis Ames Ballard, chief counsel for the Philadelphia (Pa.) Rapid Transit Company, has filed a complaint with the Public Service Commission against the advances in rates for electrical energy proposed by the Philadelphia Electric Company. According to this complaint, the Philadelphia Rapid Transit Company has contracts with the Philadelphia Electric and its subsidiaries, the Delaware County Electric and the Beacon Light Companies, for a supply of current to operate trolley lines. Originally the contracts were made for a term of ten years, and, according to Mr. Ballard, they still have five years to run.

CHARGES CONTRACT VIOLATION

It is charged in the complaint that the schedules of increased rates asked for by the Philadelphia Electric and its subsidiaries are in violation of these contracts. The petition also sets forth that the increased rates may necessitate an advance in fares. Mr. Ballard is quoted as stating:

"We are contesting the right of the Philadelphia Electric Company, first, to abrogate its contracts with us without notice, and, secondly, the method of breaking the contracts. I have not the exact figures of the railway's annual electric current bill at hand, but the sum is considerable. With other expenses of operation increasing, naturally there must be some increase of revenue if the electric power rate is to be increased. We have ten-year contracts with the electric company that still have five years to run. The rate in those contracts was fixed by the electric company. They were good contracts for five years, but now that the shoe is beginning to pinch they want an increase, and we have protested against it."

Individual consumers will not be affected by the increases, the petition of the electric company exempting municipal and residential bills. Appeal is made for an increase of 20 per cent in the surtaxes on all classes of power current. The increase will apply upon \$9,000,000 of revenue out of a total gross revenue for 1917 of \$11,700,000.

(Concluded from page 100)

reasonable. The public wants to pay the honest and necessary cost of service rendered. If we address ourselves to this problem with the public good singly in mind we can find a solution, difficult though it may be. It may not enhance our own personal political fortunes but that consideration ought to be of no moment compared to the satisfaction of doing right."

Director General of Railroads Not Planning to Take Over Electric Lines

Measure Now Pending in Congress Likely to Result in a Law That Will Clear the "Twilight Zone"

Reports published in various newspapers that William G. McAdoo, director-general of railroads, has issued orders for placing certain electric railroads under Government control are not borne out by inquiries made at Mr. McAdoo's office by the Washington correspondent of the *ELECTRIC RAILWAY JOURNAL*. There is no record at the director-general's office of an order placing the lines of the Lehigh Valley Transit Company under Government control, according to official statements made in Washington, and the director-general, it is stated, is not contemplating any similar move in regard to those or any other lines, at this time.

One of the most important reasons why no such step is now under consideration is the fact that the administration railroad bill, designed to carry out provisions of President Wilson's recommendations to Congress in regard to transportation systems, is now before Congressional committees. Until Congress acts, it is stated at the office of the director-general, there will be no move which members might consider an invasion of their all-powerful rights, or which, to say the least, might be considered not in the best taste on the part of an executive official of the Govern-

ment. Government executives rarely if ever take action on matters being considered by Congress. This custom applies even to the President of the United States.

It is pointed out in Washington that the proclamation of the President taking control of the railroads of the country, and making allusion to the possibility of eventually taking over certain electric railways engaged in interstate commerce, was issued while Congress was in recess. Since that time the President has made a number of recommendations to Congress in regard to the railroads, and it is expected that Congress will bring forth a law which will take many questions out of the "twilight zone."

On the other hand, it is recognized in administration and executive circles in Washington that the time may come when it will be desirable from a Government point of view to take over certain electric railways serving works of important manufacturers of munitions and engaged in interstate commerce. Surveys of such fields and possibilities by the officials attached to the staff of the director-general of railroads are being made, in a tentative manner, for the sake of gathering information.

Philadelphia Transit Lease Signed

Both Branches of Councils Pass Measure for Development and Operation of High-Speed Lines

The Select Council of Philadelphia, Pa., on Jan. 3 concurred with the Common Council and passed without debate the ordinance authorizing the lease of the city's high-speed transit facilities, when and as built, to the Philadelphia Rapid Transit Company. The bill was approved immediately by the Mayor. Only the formality of confirmation by the stockholders of the company and the sanction of the Public Service Commission are necessary to complete the compact.

PROVISIONS OF LEASE

The principal provisions of the lease are:

Payments to the city and company, in proportion to the relative investment of each, equal to a 5 per cent dividend.

Eight-cent exchange tickets to be abolished outside of the delivery district in the central part of the city within sixty days after the signing of the lease, and universal free transfers to be substituted therefor.

On the opening of the Frankford line, exchange tickets to be abolished inside the delivery loop and free transfers substituted therefor.

Fares to be revised upward or downward, according to the amount of the gross revenue and the fixed demands on that fund.

Broad Street subway, from League Island to Olney Avenue.

Frankford line, from Front and Arch to Rhawn Street.

Bustleton and Byberry surface line.

Darby line, from Thirtieth and Market Streets to Darby.

Parkway subway, from City Hall to Fairmount Park, connecting with an elevated line to Roxborough.

Delivery loop-subway in Arch, Eighth and Locust Streets, connecting with the Broad Street subway.

Chestnut Street subway, as a possible connection between the Frankford and Darby elevated lines.

One of the features of the proposed lease is a board of supervising engineers, which will have control over the operations of the unified system. Through an amendment to the lease, made before its passage by Common Council, the director of city transit will be a member of this board. The company will name a member and it is assumed that one of the transit company's chief engineers will be chosen. The third member will be named by agreement of the city and the company.

The next step is the signing of the lease by Thomas E. Mitten, president of the Rapid Transit Company. He cannot affix his signature for a month, for the reason that the proposition must be advertised to the stockholders

for thirty days and then a meeting of the stockholders will be held. Finally, the lease will be submitted to the Public Service Commission for its approval.

Trenton Tax Case Appealed

Frank S. Katzenbach, Jr., counsel for the Trenton & Mercer County Traction Corporation, Trenton, N. J., has filed in the Supreme Court reasons why the court should reverse the decision of the State Board of Taxes and Assessments sustaining the assessment of the Mercer County Tax Board on the company's property in 1916. One of the reasons is that the going value of the property, as defined by the State Tax Board, is not taxable under the laws of New Jersey.

M. O. Bill in Rhode Island

An act has been introduced in the House of Representatives of Rhode Island by Mr. Kiernan, creating a commission of three men to draw up and present as soon as possible, such legislation as would be necessary and desirable to enable the State to take over, run and own, all of the electric railways in Rhode Island. The measure has been referred to the judiciary committee for consideration.

Editors Praise Mr. Dempsey

Brooklyn Papers Are Agreed that Wise Choice Was Made in Electing Him Vice-President

The election of J. J. Dempsey as a vice-president of the Brooklyn (N. Y.) Rapid Transit Company, announced in the *ELECTRIC RAILWAY JOURNAL* for Dec. 29, was promptly recognized by the Brooklyn papers as a just reward for ability displayed previously. Many complimentary things were said by them editorially of Mr. Dempsey in commenting on the changes in the personnel of the company. The *Standard Union* said:

"Mr. Dempsey's career has been brilliant. There can be only one explanation of a rapid rise like this. Mr. Dempsey, of course, is a technical expert of the first rank. In addition to that, he possesses personal qualities that enable him to obtain results from a large working force, under insistent demands for good quality of service from an exacting public. The Brooklyn transit directors do well to give such a man as Mr. Dempsey the widest field for the exercise of his powers. The war, with its draft of man power and curtailment of material resources, brings serious problems to the B. R. T. The system is to be congratulated on its success in producing a man from the ranks capable of approaching the highest places."

The *Times* said:

"It was eminently wise of the directors to elect Mr. Dempsey vice-president of the company, because, unless it be Colonel Williams, who has been with the railroad system since he was the secretary of Gov. Roswell P. Flower, no

man in Brooklyn knows the borough transportation problem like Mr. Dempsey, and none in the country surpasses him in the field of operative management. We regard it as a good fortune to the community that his merit has been so signally recognized by the representatives of the owning interest."

News Notes

Street Railroad Department Established.—On Jan. 3 the office of the City Street Railroad Commissioner of Cincinnati, Ohio, was abolished and the Department of Street Railroads, administered by the Director of Street Railroads, was established in accordance with the new city charter. Mayor John Galvin has appointed W. C. Culkins to the new position, the duties and authority of which are described in the new city charter and the new franchise ordinance of the Cincinnati Traction Company.

Expense of the Toledo Street Railway Commission.—In replying to a request from Councilman Frank Miller, Mayor Milroy made the following statement to the City Council of Toledo, Ohio, on Dec. 31: "There is no moral or legal obligation on the city to pay for any service of the commission. The commission, of course, must pay for its legal counsel and for its office room. There was a public spirited citizen who offered to pay this expense. If the commission reports an electric-railway plan suitable to the voters of Toledo, then I think there would be a moral debt to the commission. No expense could be charged to the city without the consent of the people by vote."

New Franchise for East Cleveland.—A managerial form of government went into effect in East Cleveland, Ohio, on Jan. 1, with C. M. Osborn at the helm. Mr. Osborn is an engineer. He has had long experience in municipal affairs. Under him negotiations will be taken up with the Cleveland Railway for a new franchise covering both the Euclid Avenue and Hayden Avenue lines. The franchise, on the latter expired last April, but that on Euclid Avenue runs to February, 1921, with the same fare as prevails in Cleveland. At the present time cars are being operated on Hayden Avenue under a temporary contract at a fare of 5 cents. Citizens of East Cleveland want a blanket contract.

Association Meeting Program

Illinois Electric Railways Association

It is expected that the Illinois Electric Railways Association will hold a convention at Chicago some time the latter part of January. A program is being arranged and it is possible that the meeting will be held on Jan. 26.

Financial and Corporate

Oakland, Antioch & Eastern Reorganization Plan Filed

San Francisco, Oakland & Sacramento Railway, the Proposed Successor Company, Will Have \$8,500,000 of Stocks and Bonds Outstanding

A plan for the permanent financing of the Oakland & Antioch Railway, the Oakland, Antioch & Eastern Railway and the San Ramon Valley Railroad has been adopted by the committee representing the holders of the bonds of the companies and is about to be submitted to security holders. The submission of the plan at this time is pursuant to the order of the California Railroad Commission made in 1915, providing that one be submitted for its approval before the beginning of 1918.

The details of the plan were made public in the following official announcement:

DETAILS OF PLAN

"The Railroad Commission in a decision rendered in November, 1915, provided that a plan for the permanent refinancing should be submitted to it on or before Jan. 1, 1918.

"Pursuant to this mandate, the bondholders' committee of said roads, consisting of S. Bachman, Fred H. Beaver, A. Christeson, C. Osgood Hooker, John Lawson, Jesse W. Lilienthal, Paul A. Sinsheimer and Sydney M. van Wyck, Jr., proceeded to a careful consideration of the finances of the roads and, after many months of deliberation, is about to submit to the security holders the following plan:

NEW NAME FOR COMPANY

"A new company will be organized to take over the properties of the old companies. For the time being, the name San Francisco, Oakland & Sacramento Railway has been tentatively adopted.

"The new company will be authorized to issue the following securities:

"1. \$3,000,000 par value of twenty-year first mortgage 5½ per cent bonds.

"2. \$1,500,000 par value of 6 per cent preferred stock, consisting of 15,000 shares of a par value of \$100 each. Preferred stock will be non-assessable and will be callable at any time at 110.

"3. \$4,000,000 par value of common stock consisting of 40,000 shares of a par value of \$100 each. The common stock is to be non-assessable.

"The amount of the securities so authorized which the new company is to put out for purposes of reorganization is as follows:

"1. Twenty-year first mortgage 5½ per cent gold bonds. Not to exceed \$1,950,000 of the par value of these bonds is to be issued or set aside for the purpose of carrying out the reorganization plan. The balance of the bonds, to wit, \$1,050,000 par value, will

remain in the treasury to be issued only under stringent restrictions.

"2. Preferred Stock—Not to exceed 13,300 shares of this stock will be issued for reorganization purposes. The balance, to wit, 1700 shares, is to remain in the treasury.

"3. Common Stock—All of the common stock is to be issued.

"These securities of the new company are to be distributed among the bondholders of the companies and among persons holding bonds in pledge, so that they will receive securities of a par value equal to the par value of the securities now held by them upon the following basis: Twenty per cent bonds, 20 per cent preferred stock, 60 per cent common stock.

"Secured creditors are to be treated in accordance with the securities held by them and common stock remaining in the treasury after distribution to bondholders and holders of bonds in pledge is to be divided among the unsecured creditors."

Receiver Asked in St. Louis

Stockholder Begins Suit to Protect Equity, but Complaint Is Said to Disclose No Cause for Action

On Jan. 7 suit was begun in the United States District Court in St. Louis, Mo., for the appointment of a receiver for the United Railways of St. Louis. The petition made by the attorney for a New York holder of a small amount of preferred stock, is said to be for the purpose of preserving the equities of shareholders and securing certain restitutions from old directors.

Judge Dyer on Jan. 10 refused to issue a temporary order appointing a receiver for the company, and made subpoenas returnable in ten days. At that time the company can either file an answer or a motion to dismiss the proceedings.

The petition asserts that the company is solvent, but that money has been needlessly expended under power contracts made by directors in 1908 and in mill-tax litigation. Restitution of such money is demanded. Furthermore, it is alleged that if the pending resettlement franchise falls through the company may be forced into receivership in the interest of creditors and that this might mean disintegration of the property.

James D. Mortimer, president North American Company, which controls the United Railways, has issued the following statement:

"From a reading of the complaint it

does not appear to disclose a cause of action. The matters complained of are well known to the St. Louis public and have been explained at considerable length, so that they now know all the essential facts. The plaintiff, however, evidently remains unconvinced that the contracts under which the railway is purchasing electric power for the operation of a portion of its system are advantageous to it. Without the power so purchased the railway could operate only one-third of the number of cars it now runs regularly during rush hours, and it could not engage a new power supply at rates nearly as low as those now paid. The accomplishment of the plaintiff's purpose would be most disadvantageous to the company and the public it serves."

Several protective committees have previously been appointed in the interests of bondholders, but no interest has been defaulted on the company's indebtedness. The Board of Aldermen, as noted from time to time in these pages, has under consideration plans for a resettlement of the franchises under which the company operates.

Abandonment Prevented

Kentucky Court Says Company Must First Prove That It Cannot Operate Except at a Loss

The Southern Traction Company, Bowling Green, Ky., will not be permitted to carry out its plan of selling its property to be scrapped for junk, for the Kentucky Court of Appeals has affirmed the finding of the lower court. Meanwhile differences between the railway and the company from which it purchased power have been composed, a suit for receivership brought by the city and county has been filed away and service resumed. Under the decisions of the courts the railway will be required to show that it is losing money before it can scrap its lines and discontinue service. The Court of Appeals said:

HOW THE COURT DECIDED

"We do not consider or determine the question whether under any circumstances an electric railway that has obtained a franchise may, in opposition to the will of the municipality from which the franchise was obtained, abandon its line of road and remove its rails, poles, cars and other equipment, but we are agreed that in any event before a common carrier should be permitted to do this it should be made plain that it cannot operate except at a loss."

The Court of Appeals concurred in the opinion of the lower court, which held that if the bondholders and stockholders, who are identical, do not desire a foreclosure and a sale to determine whether a purchaser can be had, they must continue operating. If they fail it might become proper and necessary for the court to take control through a receiver and operate the property until it could be ascertained whether it could be continued as a going concern.

Better Outlook for Petaluma & Santa Rosa Line

Despite Strike and Passenger Traffic Loss, \$150,000 of Floating Debt Was Paid by the Company in 1916

Conditions more nearly normal existed in 1916 in the territory served by the Petaluma & Santa Rosa Railway, Petaluma, Cal., as far as the income from production was concerned. The prices prevailing were high enough to offset a shortage in production. This enabled the producers to recover partially from the losses suffered in the two years previous and generally improved business conditions in the territory, with a natural indirect effect on the earnings of the railway. The decrease in the amount of production of many commodities, however, made a corresponding decrease in tonnage for the railway without any direct benefit from the high prices obtaining.

	1916	1915
Gross earnings	\$273,534.19	\$283,047.63
Operating exp.	196,885.61	201,150.07
Surplus	<u>\$15,046.05</u>	<u>\$19,534.05</u>
Net earnings	\$76,648.58	\$81,897.56
Fixed charges.	61,602.53	62,362.99
Railway passengers	619,729	691,611
Steamer passengers	2,826	6,020
Railway freight (tons)	67,987	64,061
Steamer freight (tons)	89,464	87,615

Note—Operation was charged in 1916 with \$10,934 on account of depreciation and compensation insurance, while no charge was made for these items in previous years.

Both steamers of the company were tied up between June 1 and July 20, at the busiest time of the year, on account of a general strike of bay and river steambot firemen and deckhands. The company maintained its service during the strike, practically without interruption and without any appreciable loss of patronage, and resumed the operation of its steamers without paying any increase in wages. While the entire decrease of \$9,500 in gross earnings is probably attributable to the strike, the company suffered practically no net loss on account of it.

The reduction in operating expenses for the year amounted to \$15,200, as shown by the accompanying comparative statement of earnings and expenses, with charges for depreciation and compensation insurance deducted in 1916 and not in previous years. About \$8,500 of this amount is accounted for by the elimination of the expense of operating the steamers during the strike.

The passenger earnings decreased \$8,692 for the year. The decrease in 1915 was over \$10,000. Up to 1915 the passenger earnings show a consistent increase, and it is difficult to satisfactorily account for such a marked decrease in such a short time. There are several conditions which have probably contributed to it, the principal one being the increase in the use of automobiles, a great number having been sold throughout the territory during 1915 and 1916.

Notwithstanding the decrease in pas-

senger earnings and the strike of the steamer deckhands and firemen, \$15,000 was paid on the company's floating debt during the year. The amount of cash available for meeting current obligations was about \$3,000 more at the close of the year than at the close of 1915.

As to the outlook, the annual report states that there seems to be no reason to doubt that the earnings will easily meet operating expenses and fixed charges in 1917. Under normal conditions and any reasonable increase in rates, which will be applied for, a substantial increase in the surplus should be realized.

Municipal Railway Earned \$7,000,000 in Five Years

The San Francisco (Cal.) Municipal Railway system has earned \$7,039,999 since the beginning of operations, according to a statement issued recently by the Board of Public Works. On Dec. 28, 1917, the road had been in operation five years. The statement which has been made public is only inclusive of October.

Of the \$7,039,999 earned there have been disbursements amounting to \$5,193,084, with the balance in the depreciation and various other funds. Of the depreciation fund \$547,643 has been invested in bonds and there is a cash credit of \$533,803. Of this amount contracts for future extensions totaling \$454,857 have been pledged by the Board of Supervisors, leaving the actual cash balance of \$78,946 in the Municipal Street Railway fund.

New Toledo Bonds Offer to Pay Normal Income Tax

On Jan. 7 Harris, Forbes & Company and the National City Company, New York, N. Y., announced a public offering of \$10,500,000 of two-year 7 per cent coupon bonds of the Toledo Traction, Light & Power Company, Toledo, Ohio, at 98½ and interest to yield 7.82 per cent. The bonds are a first lien and secured through deposit of securities, on the electric light and power and street railway business of Toledo. Earnings of the controlled operating properties at present are more than double the interest charges on the new bonds.

With respect to tax provisions, the company agrees to pay any normal federal income tax which it may lawfully pay at the source to an amount not exceeding 4 per cent. The company also agrees to refund, through the Pennsylvania Company for Insurance on Lives & Granting Annuities, Philadelphia, the Pennsylvania 4 mills tax to holders of these bonds residing in that State.

Five years ago the Toledo Traction, Light & Power Company sold \$7,500,000 five-year 6 per cent first lien collateral

bonds due on Feb. 1 next. The bonds were sold at 100 and interest to yield 6 per cent. The new bonds to take their place will yield more than 1 per cent additional and at the same time be secured by collateral \$4,000,000 in excess of the collateral that has secured the five-year 6 per cent bonds. In addition to the \$7,500,000 bonds to be taken up there will be some additional bonds, making \$8,699,000 maturing bonds that will be retired.

Utility Issues Investment Booklet

Utility properties managed by H. M. Bylesby & Company, Chicago, Ill., are distributing a sixteen-page investment booklet to 200,000 electric and gas customers. The booklet points out the difference between speculation and investment and describes the advantages of the preferred stocks of successful utility organizations. The title is "The Straight Road to Financial Independence." It was written by W. H. Hodge, manager of the publicity department of H. M. Bylesby & Company.

Financial News Notes

Mount Vernon (Ill.) Line Wrecked.—According to official information just now available, the City Railway, Mount Vernon, Ill., was wrecked and sold by the receiver in 1917. The Hyman-Michals Company, Chicago, purchased the material.

Receiver for Abilene.—W. G. Swenson was appointed near the end of 1917 as receiver for the Abilene (Tex.) Street Railway. This action was taken on the petition of bondholders. The outstanding capital stock of the company is \$25,000, and the funded debt \$30,000.

Receiver for Defunct Line.—A receiver was appointed late in 1917 for the St. Louis, Lakewood & Grant Park Railroad, St. Louis, Mo. This line has not been in operation since the floods of 1915. A receiver was sought by the bondholders in order to sell whatever property still remains.

Sacramento Line Abandoned.—The property of the Sacramento Valley Electric Railway, Dixon, Cal., was sold at foreclosure in 1917, without the appointment of a receiver, and the line was abandoned. The right-of-way, roadbed, bridges, fences and ballast for 12 miles of track are for sale.

Chicago City Dividend Action.—The trustees of the Chicago City & Connecting Railways have declared a semi-annual dividend of 1½ per cent on the preferred stock, which makes the total declaration 3 per cent for the twelve months' period. It has also been voted to retire \$250,000 of the 5 per cent bonds and pay \$50,000 of floating debt.

Satisfactory Adjustment Made.—The Chickasha (Okla.) Street Railway has made a satisfactory adjustment with the State Board of Equalization to secure a fair valuation of the property. Some time ago the ELECTRIC RAILWAY JOURNAL published an item to the effect that this company intended to suspend operation unless such an adjustment was made.

Missouri Company Voluntarily Stops Operation.—The owners of the Mexico Investment & Construction Company, Mexico, Mo., late in 1917 decided to abandon operation of the property, after a voluntary petition for permission to cease operation because of its unprofitableness. Dismantlement was to begin at once, and the material was to be offered for sale.

Waycross Property Being Scrapped.—The foreclosed property of the Waycross Street & Suburban Railway was resold late in 1917 to the Southern Equipment Company, Atlanta, Ga., for \$30,000, and dismantlement was begun. The foreclosure sale of the property to the Waycross Savings & Trust Company was noted in the ELECTRIC RAILWAY JOURNAL of June 23.

Receiver's Certificates for the Bay State.—Judge Morton in the United States District Court on Jan. 2 authorized Receiver Donham of the Bay State Street Railway to issue \$378,987 of receiver's certificates to pay bond interest due on Jan. 1. The receiver asked for \$766,035. The company had \$355,000 on hand Jan. 1 of which \$200,000 must be reserved for working capital.

New Key Route Bond Issue.—The California Railroad Commission has made an order authorizing the San Francisco-Oakland Terminal Railways to issue its 6 per cent demand notes for \$218,459 and to issue and pledge for their payment \$337,000 of general lien bonds, under the company's general lien mortgage. The notes and bonds are to be issued to banks in lieu of notes and bonds now held by them.

New Capital Issues Proposed.—The Murphysboro & Southern Illinois Railway, Murphysboro, Ill., has applied to the Illinois Public Utilities Commission for authority to issue \$63,000 of stock and \$250,000 of bonds. The company now has 8 miles of electric railway in operation between Murphysboro and Carbondale and the new capital is desired to extend the line from Carbondale to Carterville or Herrin, thus reaching the coal fields of Williamson County.

Suit to Foreclose Begun.—The Mercantile Trust Company, San Francisco, Cal., which has been operating the Fresno (Cal.) Interurban Railway, filed complaint on Dec. 28 looking toward the foreclosure of the trust deed covering all the property of the company. The trust deed was given in September, 1914, to secure a bonded indebtedness of \$250,000. According to the complaint filed by the trustee, interest at 6 per cent payable semi-annually has not been paid since March, 1916.

New Vice-Presidents for American Water Works & Electric Company.—At

the regular meeting of the board of directors of the American Water Works & Electric Company, Inc., J. H. Purdy and Harry E. Towle were elected vice-presidents of the company. Stuart H. Patterson's resignation as vice-president was accepted to take effect Feb. 1 next. As noted in the ELECTRIC RAILWAY JOURNAL of Dec. 8, Mr. Patterson has been elected comptroller of the Guaranty Trust Company, New York.

Bondholders Agree to an Extension.—More than 85 per cent of the bondholders of the Barre & Montpelier Traction Company, Montpelier, Vt., have agreed to an extension of their holdings, and it is anticipated that the balance will consent in the near future. For this reason, it is said, there seems to be no likelihood of the appointment of a receiver. An application to the court, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 17, was followed by efforts to effect a readjustment of the finances of the company.

Common Dividend Passed.—The Pacific Gas & Electric Company, San Francisco, Cal., with an authorized capital of \$100,000,000 and nearly \$66,000,000 common stock in the hands of the public or owned by subsidiary companies, has passed its dividend on the common stock. For eleven months to Nov. 30 the balance after all charges and the preferred dividend allowances was only \$1,569,068, against \$2,340,568 for the eleven months of 1916. This was not nearly sufficient to meet the dividend on the common.

Move to Lift Receivership.—The directors and the stockholders of the Southern Cambria Railway, Johnstown, Pa., have voted favorably upon an additional issue of bonds of \$100,000 to make settlement for damage claims of August, 1916, if they are accepted and the issue is approved by the Public Service Commission. It is said to be expected that the claims will be settled in this manner. The receivership of the company, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 24, has been continued until June 1, 1918, to permit such a settlement.

Orleans-Kenner Sale Jan. 15.—William C. Dufour, special master, will sell the property of the Orleans-Kenner Electric Railway, New Orleans, La., on Jan. 15 at New Orleans, under foreclosure of the mortgage dated April 13, 1914. The property will be disposed of subject to all taxes due and unpaid, assessments on liens prior to the lien of the first mortgage, the purchaser to assume all debts, obligations and liabilities of the receiver. The court reserves the right of exacting payment in cash of a sufficient sum to meet and retire all obligations of the receiver and all costs and expenses of the receivership. The property was offered for sale in September, but no bids were received.

Richmond Line Suspends Operation.—The Richmond & Chesapeake Bay Railway, running from Richmond to Ashland, Va., 14.8 miles, has ceased to operate. The attorney representing the controlling interest in the property obtained from the State Corporation

Commission an authorization for the suspension of business. The road was opened in 1907, and it was intended to continue construction to Washington, D. C. The bonds are said to be held by Gould interests, which own the road. It was suggested that the Virginia Railway & Power Company take over the property in order to furnish transportation to suburban residents who were only partly supplied by other means, but the company did not take any action on the proposition.

New Rochester & Syracuse Mortgage Filed.—The Rochester & Syracuse Railway, formed as successor to the Rochester, Syracuse & Eastern Railroad, has filed for record its first mortgage to the Trust Company of Onondaga at Syracuse, as trustee, to secure an authorized issue of not to exceed \$5,000,000 of first mortgage 5 per cent gold bonds dated May 1, 1917, and due May 1, 1957. Under the terms of the plan for the reorganization of the company, to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL, \$2,500,000 of the bonds are issuable forthwith in partial exchange for old first mortgage bonds, \$500,000 are also issuable at once for improvements, and \$2,000,000 are reserved for future improvements, additions, extensions, etc.

Offer for Rails of "Dan Patch" Cut-Off.—President C. T. Jaffray of the First & Security National Bank, Minneapolis, who is chairman of the bondholders' committee which recently purchased the 14-mile cut-off of the "Dan

Patch" line under foreclosure, received a telegram on Jan. 4 from R. B. Marchand of J. G. White & Company, New York, N. Y., another member of the committee, offering a price of \$75 a ton f.o.b. at an Atlantic port for the rails of this section. The remaining part of the company's 56-mile system was not bid in at the recent sale and is still being operated by the receiver. Mr. Jaffray, Mr. Marchand and A. H. Jackson of the General Electric Company formed the bondholders' committee which bought the cut-off. Mr. Jaffray wants, if possible, to keep the line in operation for the benefit of the city of Minneapolis.

Seven Pines Line Sold to Ambassador Willard.—Under a decree of the law and equity court on Dec. 17, Joseph E. Willard, ambassador to Spain, acquired from the Richmond & Rappahannock River Railway its line between Twenty-ninth and P Streets, Richmond, and Seven Pines. Mr. Willard is the principal stockholder and the only bondholder of the Richmond & Rappahannock River Railway, the receivership of which was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 17. The Seven Pines lines, it is said, will be operated as a separate and distinct corporation, the Richmond & Seven Pines Railway having been chartered for this purpose. The remaining 16.3 mile section is headed toward dismantlement. According to the latest information the State Corporation Commission has granted the petition of the Richmond & Rappahannock Railway for dissolution, but

the sale of the equipment is to be held up until Director of Railroads William G. McAdoo decides upon the utility of the line for public or war purposes. Service has been discontinued on the unsold part of the property.

Reasons for Plymouth & Shelby Receivership.—A change in mileage has taken place in connection with the Sandusky, Norwalk & Mansfield Railway and the Plymouth & Shelby Traction Company, which explains the recent receivership of the latter line. The change is the result of a lawsuit which was begun against the receiver of the Sandusky, Norwalk & Mansfield Electric Railway in 1913, when the Plymouth & Shelby Traction Company sued for rental from the receiver. The receiver, however, contended that at least 1 mile of the track belonged to the Sandusky, Norwalk & Mansfield Railway, and he questioned the ownership of the other 6.97 miles of track supposed to be part of the Plymouth & Shelby Traction Company. In October, 1917, the United States District Court finally disposed of the case and conveyed the 1 mile of track to the Sandusky company. Moreover, the court held that the Plymouth & Shelby Traction Company was a fraudulent corporation and placed the property in the hands of the receiver of the Sandusky line. The bondholders of the Plymouth & Shelby Traction Company will have to show they were innocent purchasers of bonds, and all who are not found to be such will have their bonds wiped out by the court.

Electric Railway Monthly Earnings

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$181,128	*\$135,239	\$45,889	\$35,619	\$10,270
1 " " '16	173,987	*115,884	58,103	35,819	22,284
10 " " '17	1,819,988	*1,301,182	518,806	357,279	161,527
10 " " '16	1,711,658	*1,137,113	574,545	362,313	212,232

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$76,081	*\$38,838	\$37,243	\$19,657	\$17,586
1 " " '16	73,298	*41,330	31,968	18,408	13,560
12 " " '17	876,070	*498,516	377,554	227,430	150,124
12 " " '16	823,553	*453,550	370,003	213,869	156,134

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$111,216	*\$112,519	†\$1,303	\$30,866	†\$32,169
1 " " '16	103,536	*73,866	29,670	29,735	†65
12 " " '17	1,335,115	*1,096,202	238,913	358,507	†119,594
12 " " '16	1,230,205	*798,411	431,794	355,949	75,845

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$1,822,283	*\$1,186,101	\$636,182	\$466,230	\$169,952
1 " " '16	1,510,666	*860,290	650,376	426,081	224,295
12 " " '17	19,460,726	*11,919,695	7,541,031	5,255,160	2,285,871
12 " " '16	16,705,218	*9,064,088	7,641,130	5,020,444	2,620,686

CONNECTICUT COMPANY, NEW HAVEN, CONN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$788,828	*\$698,131	\$90,697	\$109,825	†\$3,327
1 " " '16	759,716	*636,392	123,324	96,488	†49,557
11 " " '17	9,185,515	7,293,993	1,891,522	1,098,820	†991,276
11 " " '16	8,758,236	*6,294,702	2,463,534	1,079,337	†1,633,225

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$243,036	*\$170,298	\$72,638	\$69,843	\$2,795
1 " " '16	229,986	*154,531	75,455	69,058	6,397
12 " " '17	3,078,224	*2,036,623	1,041,601	816,409	225,192
12 " " '16	2,845,347	*1,751,043	1,094,304	808,838	285,466

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$71,307	*\$57,327	\$13,980	\$15,457	†\$1,477
1 " " '16	61,871	*47,460	14,411	15,246	†835
12 " " '17	899,313	*672,771	226,542	186,425	40,117
12 " " '16	798,318	*543,474	254,844	188,312	66,532

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$212,264	*\$134,094	\$78,170	\$40,628	\$37,542
1 " " '16	199,981	*120,520	79,461	42,314	37,147
12 " " '17	2,452,118	*1,577,178	874,940	492,061	382,879
12 " " '16	2,370,491	*1,445,906	924,585	509,791	414,794

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$24,889	*\$24,220	\$669	\$7,982	†\$7,239
1 " " '16	22,650	*22,367	283	7,987	†7,659
11 " " '17	369,882	*314,853	55,029	87,818	†\$22,168
11 " " '16	332,520	*270,906	61,614	87,836	†\$25,716

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$44,345	*\$46,699	†\$2,354	\$85,725	†\$7,362
1 " " '16	52,414	*47,276	5,138	\$5,972	†\$266
11 " " '17	509,569	*508,601	968	\$79,507	†\$68,580
11 " " '16	515,498	*535,956	†20,458	\$85,391	†\$60,203

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$525,811	*\$324,600	\$201,211	\$177,512	\$23,699
1 " " '16	479,367	*242,563	236,804	182,115	54,689
12 " " '17	5,942,084	*3,354,412	2,587,672	2,156,099	431,573
12 " " '16	5,453,455	*3,035,833	2,417,622	2,177,998	239,624

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '17	\$18,669	*\$24,472	†\$5,803	\$2,633	†\$8,410
1 " " '16	14,063	17,211	†3,148	2,018	†\$1,138
11 " " '17	228,459	*256,773	†28,314	24,630	†\$2,631
11 " " '16	210,971	*226,143	†15,172	20,014	†\$3,489

*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds of the company, paid by the New York, New Haven & Hartford Railroad under guarantee, also

interest on notes held by the New York, New Haven & Hartford Railroad not credited to income of that company.

Traffic and Transportation

Through Service Case Decided Public Service Commission Refuses to Order Restoration of Through Serv- ice by Foreign Cars

Restoration of through service by foreign cars between Lexington and Harvard Square, Cambridge, Mass., was recently petitioned the Massachusetts Public Service Commission by citizens of Lexington. The service complained of is furnished by the Middlesex & Boston Street Railway, operating between Lexington and Arlington Heights and by the Boston Elevated Railway between the latter point and Harvard Square, where transfer to Boston is made via the Cambridge subway.

Formerly the cars operated by the Middlesex & Boston Street Railway were operated over the Boston company's tracks to Harvard Square on a thirty-minute headway. In June, 1916, through service was discontinued. The Middlesex & Boston Street Railway cars are now operated to Arlington Heights only so that Lexington passengers going to or from Boston are compelled to change cars at the former point.

The Boston Elevated Railway operates surface cars on a six-minute headway between Arlington Heights and Harvard Square, and the Middlesex & Boston Street Railway on a thirty-minute headway during normal hours, with rush-hour service on fifteen-minute time. The petitioners complained that the transfer causes them much inconvenience and delay, especially when outward bound from Boston to Lexington.

LARGE CARS AND TRAILERS NECESSARY

At the hearing the Boston Elevated Railway presented evidence that the line from Arlington Heights to Harvard Square, especially between the latter point and Arlington Center, has a very heavy traffic and contended that the present facilities for handling surface car traffic at Harvard Square were inadequate and that, in order to utilize present car and track facilities most efficiently, large car and trailer operation was necessary. Under the old arrangement the lack of carrying capacity and the smaller entrances and exits of the cars of the Middlesex & Boston Street Railway caused delay in loading which retarded traffic generally on the line.

COMMISSION CONCEDES OBJECTIONS

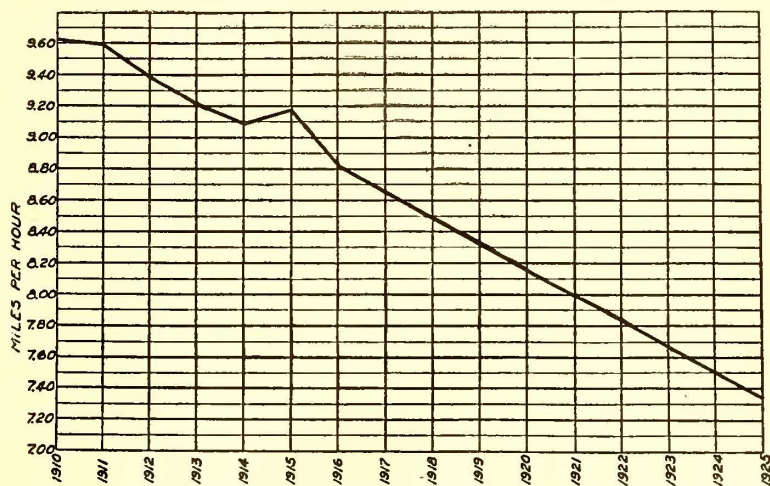
The commission has issued a decision, in which it concedes these objections to be valid. It points out that if either company had sufficient or suitable cars to operate on the joint route, these objections would be of less weight; but as neither company has such cars that it can divert to this use, it follows that the part of the complaint

relating to through service must be dismissed. Incidental to the discussion of through service there was much complaint regarding the inconvenience of transfer facilities at Arlington Heights, the terminus of each system. The commission recommends that as soon as financial conditions warrant, a waiting station be constructed with platform arranged between tracks of the two companies, to facilitate transfer under shelter.

Diagram of Detroit Speed

The Detroit (Mich.) United Railway published in *Electric Railway Service* recently the accompanying diagram, showing the average rate of speed of Detroit city passenger cars as it has been in the past, commencing with the year 1910 down to the present time and estimated from 1917 to 1925 based on past experience. In Detroit skip-stop operation has not increased the speed of the cars as has been stated

AVERAGE SPEED IN MILES PER HOUR OF DETROIT CITY PASSENGER CARS.
ESTIMATED FOR YEARS 1917 TO 1925 INCLUSIVE BASED ON AVERAGE FROM 1910 TO 1916



HOW SPEED OF DETROIT CARS IS DIMINISHING

so often; the saving has been wholly in reducing the number of unnecessary stops.

From a speed of something more than 9½ m.p.h. in Detroit in 1910 the reduction has been gradual, except when conditions in 1914 permitted a slight improvement. Since then the decline has been steady until at the present time the average is less than 8½ m.p.h. The abolition of skip-stop operation will make the decline even more marked in the years to come if Detroit continues to grow. The company asks whether the outlook is pleasing to those who travel over its lines for any considerable distance.

Massachusetts Governor Reasonable

Governor McCall of Massachusetts
Urges Equitable Rates of Fare for
Electric Railways

A rate of fare which will pay the fair cost of rendering good service was advocated by Governor McCall of Massachusetts in his inaugural address. In referring to transportation problems, he said:

"I urge upon you (the Legislature of 1918) the importance of improving the efficiency of the transportation systems of the commonwealth. The national government is now operating the steam railroads of the country, and for the present they are practically taken from the field of our consideration. Our electric railway systems are in a deplorable condition, both with regard to their financial strength, and, as to the most of them, with regard to the character of the service they render the public.

"The State should require that these corporations be honestly and economically managed, and that they provide good accommodations for their patrons and do away with the excessive crowding of cars. The companies should, however, be permitted to receive for this

service a rate of fare which would pay the fair cost of rendering such service. Our people do not desire transportation wholly or in part free, but they desire and should receive good service and at its fair cost. The chief elements of cost of such service are reasonable wages, maintenance of the property, and a fair return upon actual investment, and not upon inflated values.

"I recommend legislation designed to enable our electric railways to be efficient servants of the public. If the Public Service Commission does not possess sufficient authority in the premises I recommend that additional authority be granted to that body."

Company Paper

San Diego Electric Railway States What It Hopes to Accomplish with Its New Paper

Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of Jan. 5, page 62, of the establishment of the *San Diego Electric Railway News*. The company has stated its aim in the first issue of the paper as follows:

"The purpose of this little paper is to create friendship between the public and the street car system. Its policy is to tell people the truth about railway operation in order that they may acquire a better knowledge of the subject and consequently be better able to exercise their judgment in railway matters when the same shall be necessary. It is hoped through this publication to promote a closer relationship between the traveling public and the electric railway system.

COLUMNS OPEN TO THE PUBLIC

"The *San Diego Electric Railway News* will print from time to time matters of interest in connection with the transportation of passengers not only in San Diego, but in other communities in the United States and in foreign countries as well.

"The columns of the paper will be

kept open to the public as far as possible. The editor will be glad to receive signed letters containing suggestions regarding service, etc. After such letters have been referred to the proper department head for consideration, if they are of sufficient public interest, they will be published with the company's statement in reply.

EMPLOYEES HUMAN—LIKE PRAISE

"The San Diego Electric Railway aims to give satisfactory service to its patrons and to have its employees both courteous and attentive to the needs of the public. Its officials are glad to be informed of any defect in the service or any discourtesy or inattention on the part of its employees. Any complaints along these lines should be sent to the editor of the *San Diego Electric Railway News* where they will be promptly taken care of. At the same time, it is hoped that the public will just as readily write to the editor when they think a conductor or motorman or any other employee is deserving of praise for attention to his duties and his attitude toward the patrons of the company.

"This little paper will be published once a month and distributed in the company's cars as long as the edition lasts."

Freight Plan Discussed

Matter of Handling Freight on Chicago Surface and Elevated Lines Before Council Committee

The proposed plan to allow the surface and the elevated railways operating in Chicago, Ill., to carry freight was discussed on Jan. 4 before the subcommittee of the City Council on local transportation. The Aldermen favored the proposition, except that such a plan might interfere with the carrying of passengers.

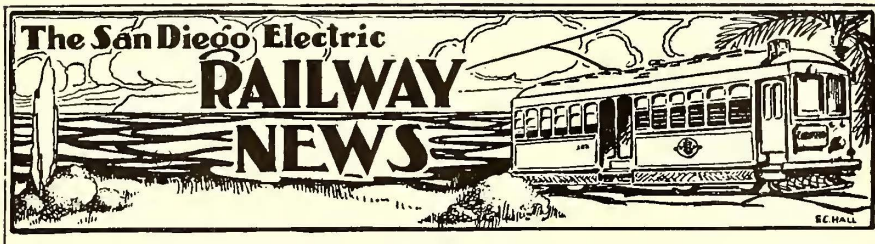
John E. Wilkie, assistant to the president of the Chicago Surface Lines, is reported to have said:

"We would have to construct elevators and loading stations and certainly would have to look on the proposition as a permanent one and not a war measure, because it would entail the expenditure of a lot of capital."

G. T. Seely, assistant general manager of the Chicago Elevated Railways, agreed with Mr. Wilkie. He said:

"Before this could be carried out a plan should be made for developing it on a big scale. It would not help matters simply to adopt it as a war measure. The investment must be considered."

Most of the members of the subcommittee declared that they would sanction the plan if it provided for carrying freight after the usual hours. The representatives of the roads will go into the matter and report back to the subcommittee before any further action is asked.



HEADING OF NEW PUBLICATION OF THE SAN DIEGO ELECTRIC RAILWAY COMPANY

Six-Cent Fare for Portland

Commission Considers Existing Rates Confiscatory — Public Ownership Would Not Help

The Portland Railway, Light & Power Company was granted a 6-cent fare in a decision handed down by the Public Service Commission of Oregon on Jan. 5. The new rates are effective from Jan. 15. They are as follows: Cash fares, 6 cents. Unlimited tickets five for 30 cents to be sold by all conductors. Unlimited book tickets of fifty to be sold for \$2.75. Limited tickets for school children 4 cents each. All tickets and cash fares are to include transfer privileges. In its ruling the commission says:

"It is evident to the commission that if the company be denied relief it must inevitably go into the hands of a receiver, for on the interurban lines the operating expenses equal the receipts, and the earnings of the light and power department are insufficient to meet the bond interest of the whole system or even to make a fair return on the investment in that branch of the utility."

The commission holds that relief is absolutely necessary because since 1912 the company has encountered financial stringencies, suffered from an enormous increase in the number of private automobiles, had to meet jitney competition and been confronted with war prices, a combination of adverse conditions with which no industry unable to protect itself by an increase of prices could possibly contend.

PUBLIC OWNERSHIP WOULD NOT HELP

The commission holds that public ownership would not solve the problem because the cost of service would not be less than now and because if the city undertook to take over the property it would be required to pay probably 25 per cent more than the commission valuation, and the money for such purpose could not be secured for less than 6 per cent, so that the present interest charge would not be reduced.

The decision also holds that in spite of the fact that the company for the last two months has attempted to inaugurate all the economies suggested in the commission's former decision refusing an increase in fare relief sufficient

Pittsburgh Fare Answer

The Pittsburgh (Pa.) Railways on Jan. 3 filed with the Public Service Commission an answer to the complaint of the city of Pittsburgh against the proposed increase in fares from 5 to 5½ and 6 cents. The company declares the proposed increase is absolutely necessary if it is to operate under its present organization.

It is hinted in answer that unless the increase is allowed the company will break up into separate units represented by various underlying companies, thus depriving the public of benefits incident to operating the lines as a unit. Intense labor competition due to the war, the high cost of materials, and the refusal of trainmen to operate trailers and trippers are among the reasons set forth urging more fare.

It is maintained that the service is reasonably adequate under existing conditions. The Public Service Commission will fix a date for a hearing on the city's complaint. The increase is to become operative on Jan. 22.

to prevent insolvency would not be forthcoming. The commission also points out that the law forbids the establishment of rates whose effect would be confiscatory of the property of a utility and that "it has been shown to the satisfaction of the commission that the existing rates with the present cost of operation are in fact confiscatory."

Hearing on Indianapolis-Cincinnati Fares

Indiana Commission Takes Under Advisement Request for a Two and One-Half Cent Rate

The preliminary hearing on the petition of the Indianapolis & Cincinnati Traction Company for a 2½-cent rate of fare was heard before the Public Service Commission of Indiana on Jan. 3. The principal argument hinged on the question as to whether the 2-cent railroad passenger fare law of the State applied to the interurban railroads.

PRESIDENT HENRY REPRESENTS THE COMPANY

Charles L. Henry presented the case of the company. His argument was based on three principal points. He contended that if the 2-cent fare law, as applied to the interurban roads, was shown to be confiscatory, there should be relief under the Constitution for the interurbans, regardless of the 2-cent fare law; that many decisions of courts and opinions of attorney-generals and rulings of the public service commission and the former railroad commission showed that the trend of opinion generally on these authorities was to the conclusion that the 2-cent fare law did not apply to interurbans, and that the Public Service Commission act, and its later interpretation, implied, at least, that the law was not applicable to the interurban roads, and, therefore, that the interurbans might legally secure through the commission increased fares for passenger service.

CITY ATTORNEY PROTESTS

R. W. Harrison, city attorney of Shelbyville, one of the principal towns on the lines of the company, argued that the Indiana courts had uniformly held that statutes may not be repealed by implication. He pointed to the fact that the Legislature of 1917, which amended the 2-cent fare law, did not see fit to amend it so as to make the interurbans specifically exempt from its provisions. He stated that the Legislature had felt that the interurbans, by competition, would be kept within the 2-cent limit, and that the law intended throughout that the interurban roads should not exceed the 2-cent-a-mile limit.

OPPOSITION LACKS SUPPORT

Mr. Henry has received a communication from the Chamber of Commerce of Shelbyville that they were not in sympathy with the attitude of the city in opposing the petition of the company, and that they believed the interurban railways were entitled to receive increases in the rates of fare for both passenger and freight service.

CASE UNDER ADVISEMENT

The Public Service Commission announced at the conclusion of the argument that it would take the case under advisement, and if it decided that it had jurisdiction in the matter would appoint a time within a few days to hear the evidence. On Jan. 7 the commission

forwarded a communication to the company, stating that it had been unable to reach a decision in regard to its jurisdiction, but appointed Jan. 9 as the time when a hearing would be held and the attitude of the commission in the case made known.

Transportation News Notes

Straight Fare for Danville.—The Danville Street Railway & Light Company, Danville, Ill., a subsidiary of the Illinois Traction System, is said to be preparing to petition the Public Utilities Commission of Illinois for permission to abolish the sale of eleven tickets for 50 cents and to charge instead a straight 5-cent fare.

"Trolley Weal" to Issue Quarterly.—In keeping with the national movement for conservation of material and labor, the *Trolley Weal*, which is published in the interests of the employees of the Public Service Corporation of New Jersey, will, until further notice, be issued quarterly instead of monthly. The next issue of the *Trolley Weal* will appear in March.

Near-Side Stops Desired.—Councilman Meyers has prepared a resolution to be introduced in the Council of Cleveland, Ohio, which will require all cars to stop on the near side at crossings. At the present time they stop on the near side at all safety zones and at crosstown lines. His desire is to make this custom uniform throughout the city.

Electric Railway Rate Application Not Affected.—The Railroad Commission of California has decided that Government railroad control will not affect the applications for rate increases which electric railways have filed. The news has strengthened electric railway securities, and, with the freight business these lines are developing, the prospects in this field are much better than they have been.

New Beaver Valley Rates.—The Beaver Valley Traction Company, New Brighton, Pa., has issued on the thirty days' statutory notice a new schedule of rates and fares for service in the Boroughs of Beaver, West Bridge-water, Rochester, Monaca, Freedom, Conway, New Brighton, Beaver Falls, College Hill and surrounding territory. The fares between all points shown in the former tariff as 5 cents will hereafter be 6 cents. A fare zone has been added for through passengers from Twelfth Street, Conway, to Vanport. Cut-rate tickets in books of twenty-one for \$1 will be discontinued. The

new 6-cent tickets will be offered in strips of ten for 55 cents. The new rates are effective from Jan. 26.

New York Roads Cancel Interchangeable Fares.—The Auburn & Syracuse Electric Railway; the Buffalo, Lockport & Rochester Railway; the New York State Railways and the Rochester & Syracuse Railroad have all filed with the Public Service Commission for the Second District of New York rate changes which indicate that the rules and regulations governing the sale of interchangeable coupon ticket books at a price of \$10 for an aggregate of \$12 worth of transportation will be canceled and their sale discontinued, effective from Feb. 1.

More Snow Equipment Recommended.—Because of the practical tie-up of a number of surface railways in the Bronx, some of which were not opened for full service until four days after the recent storm, the Public Service Commission of the First District has sent a letter to Edward A. Maher, Jr., vice-president of the Union Railway, recommending that that company purchase six snow plows in order to clear its tracks in time of future storms. The letter points out that the type of snowsweepers used by the company are not sufficient or efficient during a heavy fall of snow.

Fare Hearing in New York Goes Over.—The hearing before the Public Service Commission for the First District of New York on the applications of the Third Avenue Railway, the New York Railways, the Brooklyn Heights Railroad, the Staten Island Midland Railway and the Richmond Light & Railroad Company relative to changes and advances in rates of fare has been postponed until Jan. 21. F. J. H. Kracke and Charles Bulkley Hubbell, new commissioners appointed recently by Governor Whitman, have taken up their duties with the commission as the successors to William Hayward and H. W. Hodge, both in military service. Meanwhile they will acquaint themselves with the proceedings so far taken with respect to the fare applications.

I. T. S. Flat Fare Allowed.—The Public Utilities Commission of Illinois on Jan. 5 issued an order allowing the Illinois Traction System to change the basis of fares from the 5-cent zone system to a 2-cent-a-mile basis on the showing of the company in the petition that the change would remove discrimination and would increase the revenue less than one-third of 1 per cent. The ruling also allows a 2½-cent cash fare where paid on the train by a passenger boarding at an agency station. This is designed to relieve conductors now overburdened by the collection of cash fares and the war tax and to encourage the purchase of tickets at stations. The company will file the proposed tariffs to become effective on Feb. 1. The reasons for the proposed change were summarized in the item "I. T. S. Applies for Mileage Basis Fares," which appeared in the *ELECTRIC RAILWAY JOURNAL* for Oct. 27, page 791.

Personal Mention

Thomas F. Mullaney has just resigned as chief engineer of the Third Avenue Railway, New York, N. Y.

W. C. Culkins, who has been street railway commissioner of Cincinnati, Ohio, has been appointed to the office of Director of Street Railroads under the provisions of the new city charter and the new franchise ordinance of the Cincinnati Traction Company.

Henry N. Staats, who resigned on Dec. 1 as insurance expert of the American Electric Railway Association, has accepted the position of insurance expert of the Associated Building Owners of America. Mr. Staats has an office in the Monadnock Building, San Francisco, Cal.

Carrie A. Swartz has been appointed assistant claim adjuster of the Columbus Railway, Power & Light Company, Columbus, Ohio. Miss Swartz is also acting secretary of the American Electric Railway Claims Association, the secretary and treasurer of which, B. B. Davis, died recently.

H. C. Kaerscher, formerly master mechanic of the Elmira Water, Light & Railroad Company, Elmira, N. Y., has been appointed to succeed Niles Persons as assistant master mechanic of the New York State Railways, Rochester lines. The appointment of Mr. Persons to Gary, Ind., is noted elsewhere in this department.

Edward Coy was recently appointed engineer of maintenance of way of the Chicago, Ottawa & Peoria Railway, Ottawa, Ill., as noted in the *ELECTRIC RAILWAY JOURNAL* of Dec. 22. In the item which appeared at that time reviewing Mr. Coy's career the name was printed "Troy" through a typographical error.

Walter C. Douse has been appointed purchasing agent of the Toronto & York Radial Railway, Toronto, Ont., to succeed G. K. Hyde. Mr. Douse spent nearly five years with the Toronto Hydro-Electric system as chief clerk and was also connected for almost five years with the Toronto (Ont.) Railway as assistant purchasing agent.

Thomas P. Burke, who since August last has been supervisor of the railway lines of the Public Service Corporation of New Jersey between Trenton and Newark, has resigned from the company. Before that Mr. Burke was supervisor of the Middlesex division for eleven years. He has been connected with the Public Service Corporation and its predecessors for more than twenty-three years.

Carl H. Van Hooven, claim agent of the Manila Electric Railroad & Light Company, Manila, P. I., is on a visit to the United States. He is calling on a number of the representative electric railways throughout the country to study their methods of handling

claims. Mr. Van Hooven went to Manila from St. Paul more than ten years ago and began work on the street railway there as a motorman. Since then he has taken a degree at the university and been admitted to the Bar.

Niles Persons has resigned as assistant master mechanic of the New York State Railways, Rochester Lines, to accept a position as master mechanic of the Gary & Interurban Railway. Previous to becoming connected with the company at Rochester Mr. Persons was assistant master mechanic of the United Traction Company, Albany, N. Y. He has been in railway shop and maintenance work for the last twelve years, starting as apprentice in the armature department of the United Traction Company.

John A. Hillman has resigned as master mechanic of the Dayton (Ohio) Street Railway. Mr. Hillman started his electric railway career as a helper, wiring electric cars for the Cincinnati (Ohio) Traction Company. From there he went to the Cincinnati, Newport & Covington Traction Company and then to the Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati. He then became connected with the Bullock Electric Company, Cincinnati, and later entered the employ of the Cincinnati Traction Company. Mr. Hillman's next position was with the Cincinnati Car Company, where he was in charge of truck repairs. He left the Cincinnati Car Company to become connected with the Dayton Street Railway.

John Hayes Smith, consulting engineer, Milwaukee, Wis., has closed his office to accept a position as assistant engineer to the Public Service Commission of Pennsylvania. Mr. Smith was graduated from Cornell University. He associated himself with the Westinghouse Electric & Manufacturing Company shortly after graduation and remained in the employ of that company about six years. He was the first manager of the *Electric Journal*, Pittsburgh. He resigned from that paper to become editor of the *Electrical Age*, New York, in which capacity he continued for four years. Since that time Mr. Smith has been in Milwaukee. For two years he was with the Milwaukee Electric Railway & Light Company, resigning as commercial engineer to take up consulting work.

N. R. Longfellow has severed his connections with the Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., to accept the position of general manager of the Waterville, Fairfield & Oakland Railway, Waterville, Me. Mr. Longfellow is thirty-two years of age. At the age of seventeen he entered the service of an electric launch manufacturing company in New Jersey. Two years later he entered the service of the Augusta, Winthrop & Gardiner Rail-

way, Lewiston, Me., as general repair man. In 1910 he was made foreman of the repair shops at Augusta, then under the management of the Lewiston, Augusta & Waterville System. In 1914 he was made general foreman of repairs for the entire system with headquarters at Lewiston and has continued in that capacity since then. Mr. Longfellow is a man of pleasing personality and is exceptionally popular with all the employees and the heads of the departments.

Robert A. Hadden, Joplin, Mo., has been appointed assistant manager of the Bangor Railway & Electric Company, Bangor, Me., succeeding Maurice E. McCormick, who resigned to accept the position of assistant to Harry Hooper, manager of the New Brunswick Power Company, St. John, N. B. Mr. Hadden was educated in Missouri and engaged in electric railway work there. His first work in the East was in New Jersey, where, as a representative of the Cooley & Anderson Company, Ann Arbor, Mich., he was engaged under the direction of the Public Service Corporation of New Jersey on valuation work. His association with that company lasted for several years. In 1916 Mr. Hadden was engaged by the Bangor Railway & Electric Company as an appraisal and valuation expert. His work was of such high order and his services of such value that when the vacancy occurred in the office of assistant manager Mr. Hadden was offered the position. After leaving Bangor in 1916 he went to the Acme Power Company in Toledo, Ohio, controlled by H. L. Doherty & Company. There he had general oversight of electrical construction work in one of the largest electrical plants in the country.

M. J. Perrin, manager of transportation of the San Diego (Cal.) Electric Railway, recently completed his thirtieth consecutive year of service with the company. One night in December last he and about twenty other heads of various Spreckels companies and departments who have been associated with Mr. Perrin during his long connection with the railway celebrated the event in a dinner at the Hotel del Coronado. Among those present were: William Clayton, vice-president and managing director of the Spreckels Companies; Reed Dilworth, James McMullen, Major C. G. Ross, B. M. Warner, A. Ervast, Claus Spreckels, John J. Hernan, E. M. Harris, George Holmes, J. Fred Traggardh, Frank Von Tesmar, E. L. Phillips, E. J. Burns, W. A. Moore, Nat R. Titus, George A. Cheney, D. W. Pontius, H. G. Wellman, W. R. Saxon, Neil Brown and M. J. Perrin. While the majority of the guests had been connected with the company or associated with Mr. Perrin for a shorter period than thirty years, there were many personal reminiscences of times dating back to the horse-car days. The evening was closed with the presentation by Mr. Clayton on the part of those present of an appropriate token of regard for the host.

Changes in Twin City Officers

New General Manager and New Division Superintendents Appointed by the Twin City Rapid Transit Company

A number of changes has been announced in the personnel of the Twin City Rapid Transit Company, Minneapolis, Minn., further strengthening the organization of that company. Foster Hannaford, for two years superintendent of the St. Paul lines, has been appointed general manager of the company, the duties of which office have been carried on for six years by President Horace Lowry. C. B. Goodsell has been appointed superintendent of the Minneapolis lines to succeed Donald Goodrich, who has enlisted in the naval reserve. Austin L. Cunningham has been appointed superintendent of the St. Paul lines to succeed Mr. Hannaford. O. J. Gilcreest has been appointed assistant to J. J. Caufield, general superintendent.

MR. HANNAFORD

Foster Hannaford, for two years superintendent of the St. Paul lines of the Twin City Rapid Transit Company, has been made general manager of the company. Horace Lowry, president of the company, has carried on the work of this office for six years. After he was graduated from the Sheffield Scientific School Mr. Hannaford was for two years in the Westinghouse shops at East Pittsburgh, did technical work for one year abroad and then entered the employ of the Illinois Traction Company. He became superintendent of substations of that company, and then chief engineer of the McKinley power plant at St. Louis, the largest power plant of the Illinois Traction System. Later he became operating engineer

tended the public schools in Minneapolis and was graduated from the South High School in that city in 1904. He then took a course in the Minneapolis Business College. For about a year after leaving school he was employed in a grain office at Duluth. He next was secretary to the manager of the



A. L. CUNNINGHAM



O. J. GILCREEST

Minneapolis *Journal* for a year. He joined the Twin City lines on April 1, 1907, as secretary to the general manager, and in 1913 was appointed assistant to the general superintendent, in which position he has continued to the present.

MR. CUNNINGHAM

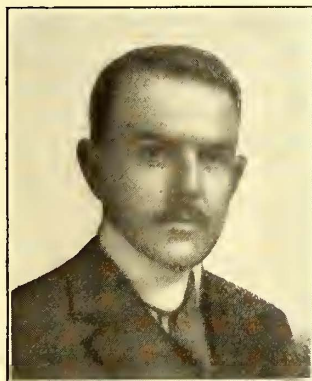
Mr. Cunningham was born on March 26, 1884, in St. Paul. He was educated

City Lines. Mr. Cunningham has worked for the company as dispatcher, inspector, chief clerk and supervisor.

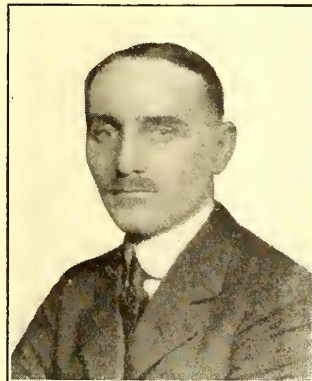
MR. GILCREEST

Mr. Gilcreest was born in Gainesville, Tex., on Aug. 18, 1886. He was graduated from high school in 1905 and was graduated from the electrical engineering department of the University of Texas at Austin in 1909. During the summer of 1909 he was with a construction crew at Gatesville, Tex. In the fall

of 1909 he entered the testing department of the General Electric Company at Schenectady, and in the fall of 1910 took a post-graduate course at the Massachusetts Institute of Technology. In the fall of 1911 he returned to the General Electric Company and then served one year in the switchboard engineering department and two years in the railway commercial department. On Oct. 13, 1914, he entered the service of the Twin City Lines. Mr. Gilcreest has worked for the company as motorman and conductor, inspector, supervisor and later on followed up power saving and more efficient operation of car as to coasting, etc.



FOSTER HANNAFORD



C. B. GOODSSELL

and finally general superintendent of the Galesburg Railway, Light & Power Company, controlled by the Illinois Traction Company. In January, 1916, Mr. Hannaford returned to St. Paul, his birthplace. He is the son of Jule M. Hannaford, president of the Northern Pacific Railway.

MR. GOODSSELL

Mr. Goodsell was born on Sept. 21, 1886, at Fergus Falls, Minn. He at-

in the public schools. He left Cretin High School in 1901, before completing his course, and entered the service of Swift & Company and then worked as a weigher in railway mail service. In 1906 he worked for a general contracting company. In 1908 he was time-keeper and branch office cashier for the Barber Asphalt Company, and from February to September, 1908, was with the Mendota Stone Company. The same year he entered the service of the Twin

Obituary

Alex P. Humphrey, Jr., son of Judge Alex P. Humphrey, the chief counsel and vice-president of the Louisville (Ky.) Railway, was killed when his airplane fell 1500 ft. at Camp Taliaferro, Tex. Cadet Humphrey had been in training since last August.

Peter Leidenger, western sales manager of the Dayton (Ohio) Manufacturing Company, died suddenly of pneumonia at the Buckingham Hotel, St. Louis, Mo., on Dec. 28. Mr. Leidenger was born at Ironton, Ohio, in 1862. He had been with the Dayton Manufacturing Company for the last thirty years.

George Alvah Kittredge, a pioneer in the operation of electric railways in India, died at his home in Brookline, Mass., on Dec. 26, aged eighty-four years. Mr. Kittredge lived in Bombay

for more than half a century, going there as a representative of consular interests soon after his graduation from Yale.

A. C. Miller, president of the Chicago-New York Electric Air Line Railway, Gary, Ind., until May 1, 1916, died suddenly on Jan. 4. He was also vice-president and general manager of the Gary & Interurban Railroad for a number of years.

William Abial Scott, who in 1905 in association with Governor L. B. Hanna and J. W. Smith established the Fargo & Moorehead Street Railway, Fargo, N. D., now controlled by the Northern States Power Company, is dead at his home in Fargo. He was the first vice-president of the company. Mr. Scott was founder of the North Dakota State Fair Association.

Charles S. Foller, sales manager of the Union Spring & Manufacturing Company, Pittsburg, Pa., is dead. Mr. Foller was evidently drowned in an attempt to cross the Monongahela River on the ice. Mr. Foller went to Pittsburg when he was twenty-four. For five years he was affiliated with the American Locomotive Company in that city. Then he entered the employ of the Union Spring & Manufacturing Company. Mr. Foller is survived by his widow, one son and three daughters.

Edward B. Smith, head of the banking house of Edward B. Smith & Company, Philadelphia, Pa., is dead. Mr. Smith was born on Sept. 23, 1861. He entered banking in 1886 and in 1892 organized the firm of which he was the head. The firm had a part in many of the large Philadelphia underwritings, among others the Philadelphia Electric Company. Among the electric railways of which Mr. Smith was a director were the Lehigh Valley Transit Company and the Philadelphia & Western Railroad. He was one of the organizers of the Lehigh Power Securities Company.

Lee Howell, president of the Evansville, Suburban & Newburgh Railway, died on Jan. 3 at Evansville, Ind., at the age of seventy-seven. Mr. Howell had spent all his business life in the service of railroad, interurban and steamboat companies. After serving in the cavalry division of the Confederate Army from 1862 to the close of the war, he began work in the steamboat service on the Ohio and Tennessee rivers. In 1872 he became contracting agent for the Louisville & Nashville Railroad and held this position for eight years. In 1880 he was appointed general freight agent and in 1882 division freight agent of the Evansville, Henderson & Nashville division of the Louisville & Nashville Railroad, and on Nov. 1, 1882, became general freight agent of the Evansville & St. Louis and the Evansville, Henderson & Nashville division of that company, with headquarters at Evansville. He was also the head of the Evansville & Bowling Green Packet Company, operating a line of steamboats between Evansville and Bowling Green, Ky., on the Ohio and Green Rivers.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Franchises

North Vancouver, B. C.—The British Columbia Electric Railway, it is reported, will ask the City Council of North Vancouver for permission to lay tracks on the ferry wharf and to operate cars thereon. The North Vancouver District Municipality will vote at the January elections on a by-law authorizing a grant of \$2,500 to aid the company in this construction.

Waterloo, Iowa.—The Waterloo, Cedar Falls & Northern Railway has accepted the franchise passed by the voters of Waterloo on Dec. 5.

Cumberland, Md.—The Cumberland Electric Railway has received a twenty-five year extension of its franchise from the City Council of Cumberland. Under the terms of the new franchise, which will expire in December, 1942, the company will construct an extension to the Kelly-Springfield Tire Company and the new Ridgedale addition. The plans also include the double-tracking of Green and Water Streets.

Cincinnati, Ohio.—The Cincinnati, Lawrenceburg & Aurora Electric Railway has received a franchise from the City Council of Cincinnati to operate its line from the western corporate limits of Cincinnati to Anderson's Ferry. The ordinance authorizes the removal of approximately 3 miles of track from the Lower River Road to a private right-of-way on Commercial Avenue.

Track and Roadway

Edmonton (Alta.) Municipal Railway.—A report from the Edmonton Municipal Railway states that it has under construction 900 ft. of track interconnecting two parallel lines.

Municipal Railway, San Francisco, Cal.—About 2.44 miles of line will be placed in service by the Municipal Railway during this year.

Denver (Col.) Tramway.—A report from the Denver Tramway states that during 1918 it expects to place in service 1¼ miles of new track. It also expects to third-rail the Gold division from Gravel Spur, about 4 miles.

Connecticut Company, New Haven, Conn.—It is reported that this company will build an extension to its line from Terryville to Thomaston.

Georgia Railway & Power Company, Atlanta, Ga.—In view of the inadequacy of the single-track line from Buckhead to Camp Gordon, the Georgia Railway

& Power Company plans to double-track the line to a point near the intersection of Piedmont Road and Peachtree Road. If it should later develop that extension of the double track beyond the point at present contemplated would be necessary for improved service, the company plans to continue the extension.

Chicago (Ill.) Surface Lines.—An extension will be built by the Chicago Surface Lines on Monroe Street from La Salle to Canal Street.

Peoria (Ill.) Railway.—This company reports that it will reconstruct 5 miles of track during this year.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The Board of Public Works has extended until June 1, 1918, the time limit fixed for double-tracking the West Michigan Street line from Holmes Avenue to Tibbs Avenue. March 15 was the date fixed as the time when the company should complete the turn-outs and other improvements in Brookside Avenue, so that the line may also be double-tracked, if found necessary. The board extended until July 1, 1918, the time limit for completion of the North Illinois Street car line extension from Maple Road to Forty-sixth Street, and the same date was set for the completion of the South Street tracks from Virginia Avenue to Delaware Street.

Wichita Railroad & Light Company, Wichita, Kan.—This company reports that during this year it expects to place in service about 1½ miles of new track.

United Railways & Electric Company, Baltimore, Md.—This company reports that it expects to place in service during 1918 a 2-mile extension to Fairfield and a 1-mile extension on Columbia Avenue.

Pascagoula Street Railway & Power Company, Pascagoula, Miss.—This company reports that it will rebuild 3 miles of track this year.

Kansas City (Mo.) Railways.—The City Commissioners of Kansas City, Kan., have let the contract for building the Central Avenue viaduct, subject to the approval of the Kansas City Railways. The cost will be \$192,000, of which one-third will be borne by the Kansas City Railways and the other two-thirds equally by the Missouri Pacific Railway, the Union Pacific Railroad and the Chicago, Rock Island & Pacific Railway. The completion of the Central Avenue viaduct will extend the traffic way from Riverview Avenue, Kansas City, to the high line bridge across the Kaw River.

United Railways, St. Louis, Mo.—A report from the United Railways states that the company expects to place in service 3½ miles of new track during 1918. It also plans to reconstruct about 15 miles of track during this year.

New York Municipal Railway, Brooklyn, N. Y.—The new Broadway subway, connecting Rector Street, West Broadway and Forty-second Street at Broadway, was opened for service on Jan. 5. This is the most important link in the dual subway system to be placed in operation since 1913. The New York Municipal Railway, which will operate the new line, has been operating trains under Broadway between Union Square and Canal Street, thence into Brooklyn, for some time.

Nova Scotia Tramways & Power Company, Ltd., Halifax, N. S.—This company reports that it expects to place in service about 3½ miles of city track during 1918.

Cleveland & Sharon Rapid Transit Company, Cleveland, Ohio.—A report from C. H. Felton, secretary of the Cleveland & Sharon Rapid Transit Company, states that grading on its proposed line from Lockwood to Middlefield via North Bloomfield and Mesopotamia has been mostly done. It is expected that the line will be completed this year. The line will be operated by the Cleveland & Eastern Traction Company, furnishing direct connection with Cleveland. No contracts for materials have been let. [Dec. 16, '16.]

City Railway, Dayton, Ohio.—During 1918 this company will place in service 1¼ miles of new track and will rebuild 1 mile of track.

Dayton & Troy Electric Railway, Dayton, Ohio.—This company reports that it will rebuild 1½ miles of city track.

Springfield (Ohio) Railway.—An extension is being built by the Springfield Railway in the Northern Heights addition.

Oklahoma Union Railway, Tulsa, Okla.—The Board of City Commissioners has granted the Oklahoma Union Railway permission to double track its Fourth Street line from Boulder east to Boston Street, in order to facilitate the handling of the interurban and West Tulsa lines which radiate from that point.

Brantford (Ont.) Municipal Railway.—A report from the Brantford Municipal Railway states that it expects to place in service 2½ miles of new track during 1918.

***Montrose, Ont.**—The Hydro-Electric Power Commission of Ontario is building a line from the Welland River, near Montrose, around Niagara Falls City to the Niagara River near Queenston, about 12 miles, in connection with the Chippawa-Queenston power canal. It is reported that about 8 miles of construction has been completed at the northern end of the line. The line will be double-track, standard-gage, 70-lb. rails and will be ballasted with rock. The work is being done under the direction of F. A. Gaby, chief engineer of the commission.

***Whitby, Ont.**—Work has been begun on the construction of a line in Whitby from the Grand Trunk main line station to the military hospital on the lake front. This road will be the

initial unit of the street railway system authorized by vote of the municipality in adopting the hydro-radial proposal from Toronto to Whitby.

Portland & Oregon City Railway, Ore.—A report from the Portland & Oregon City Railway states that it will place in service 10 miles of new track in 1918.

Portland Railway, Light & Power Company, Portland, Ore.—About 1 mile of track will be rebuilt by this company.

Shamokin & Mount Carmel Transit Company, Mount Carmel, Pa.—This company reports that it will construct about ½ mile of new track.

Ponce (Porto Rico) Electric Company.—This company reports that it plans the reconstruction of about ½ mile of track.

Austin (Tex.) Street Railway.—Operation has been begun by the Austin Street Railway on its extension to Travis Heights.

El Paso (Tex.) Electric Railway.—This company reports that it will build 1 mile of new track in 1918.

Mineral Heights Street Railway, Greenville, Tex.—A report from this company states that it is planning to change its method of operation from the overhead system to gasoline motive power.

Norfolk Southern Railroad, Norfolk, Va.—An extension will be built by the Norfolk Southern Railroad in the village of West Munden.

Richmond & Rappahannock River Railway, Richmond, Va.—Joseph E. Willard, Ambassador to Spain, has acquired from the Richmond & Rappahannock River Railway its line between Twenty-ninth and P Streets, Richmond, and Seven Pines, the receivership of which was noted in the *ELECTRIC RAILWAY JOURNAL* of Nov. 17. The Seven Pines lines, it is said, will be operated as a separate and distinct corporation, while the remaining section is headed toward dismantlement. According to the latest information the State Corporation Commission has granted the petition of the Richmond & Rappahannock Railway for dissolution, but the sale of the equipment is to be held up until William G. McAdoo decides upon the utility of the line for public or war purposes. Service has been discontinued on the unsold part of the property. The Richmond & Seven Pines Railway was recently chartered to operate the property purchased, the president of which is Thomas B. Love, who is also president of the Richmond & Rappahannock River Railway.

Charleston-Dunbar Traction Company, Charleston, W. Va.—A report from the Charleston-Dunbar Traction Company states that during this year it expects to place in service 9 miles of track between the cities of Dunbar and Poca.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company reports that during 1918 it will reconstruct 5 miles of track.

Shops and Buildings

Southern Pacific Company, San Francisco, Cal.—Plans have been submitted to the Railroad Commission of California by the Southern Pacific Company for the erection of a new \$130,000 depot on the Alameda, San Jose, and the moving of the freight yards to the College Park district. The company will abandon its present railway lines on Fourth Street and will move to its new right-of-way on the western side of the city. The new freight yards will cost \$430,000, while the entire change will cost more than \$1,300,000.

Inter Urban Railway, Des Moines, Iowa.—It is reported that the Inter Urban Railway has had plans prepared for the construction of a four-story brick terminal station to cost about \$200,000.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—Contracts have been awarded by the Trenton & Mercer County Traction Corporation for the construction of a new building to replace that portion of the carhouse at Trenton recently destroyed by fire. Newton A. K. Bugbee & Company, Inc., will do the steel work; Edward LaRue will do the carpentry and Burton & Burton the mason work. The improvements will cost approximately \$11,000. The design of the building will be changed from that of the old structure.

Long Island Railroad, New York, N. Y.—Fire recently destroyed the storage and office building of the Long Island Railroad at Long Island City, together with two freight cars. The loss is estimated at \$125,000.

Toronto (Ont.) Suburban Railway.—A new carhouse and express shed will be built by the Toronto Suburban Railway at Guelph.

Power Houses and Substations

Connecticut Company, New Haven, Conn.—The Public Utilities Commission of Connecticut has approved the application of the Connecticut Company to erect electric transmission lines in New Haven and North Haven.

Hagerstown & Frederick Railway, Frederick, Md.—In addition to the plant at dam No. 4, the Hagerstown & Frederick Railway is building a new power house at dam No. 5. These plants will be connected with the Security plant, which is being enlarged. New transmission lines are being built to Waynesboro and Martinsburg.

Twin City Rapid Transit Company, Minneapolis, Minn.—A new automatic substation is being built by the Twin City Rapid Transit Company at Concord and Isabel Streets, St. Paul. The substation will be ready shortly and will have a capacity of 2000 hp.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Freight Congestion Serious Time for Pacific Coast Deliveries from East Doubled—Demurrage Rates to Be Increased Jan. 21

So far as can be learned from leading shippers and receivers, deliveries have grown worse rather than better. The situation is said to be more acute in the New York territory than at any other point in the country. The congestion of freight and that of unloaded cars causing this condition has reached the stage where drastic action has been found necessary. Secretary McAdoo, Director-General of Railroads, has named the week of Jan. 14 to 21 for the unloading of cars which have for months been used by consignees here as warehouses.

A jobber carrying one of the largest stocks of railway supplies in the country said deliveries are not only a sore spot, but the situation is almost unbearable. Not only is freight affected by the embargoes, but the express companies, which afforded some relief, even at a higher cost, have in some cases embargoed all but direct and incidental Government business.

Transportation conditions are very much affecting the supply of line material, which is becoming quite scarce in some quarters. Shipments held up by embargoes east of Pittsburgh are a cause of anxiety on the part of distributors. An order for locust pins placed early in June last has not been delivered yet. An acute shortage is in sight. Yellow-pine cross-arms are also in bad shape. Of three cars ordered six months ago one was received here; the others are "somewhere" in the South in transit. Fir arms are hard to get, as the lumber is being requisitioned by the government for aeroplanes and ships.

The time required for Eastern freight deliveries to the Pacific Coast has jumped from seventeen days, which was the average a month or six weeks ago, to thirty to forty days, which is the time in which shipments are now arriving. However, government control of railroads is confidently expected to improve freight shipments.

The California Railroad Commission has decided that Government railroad control will not affect the applications for rate increases which electric railways have filed. This news has strengthened electric railway securities, and, with the freight business these lines are developing, the prospects in this field are much better than they have been.

Relief of congested conditions of the Pacific Northwest terminals is expected

to result speedily from the appointment of a joint committee of railway and steamship officials to devise a solution of the problem. Federalization of railroad lines will lead, it is believed, to an early settlement of terminal problems and is certain to result in an issuance of an order to abandon intraterminal switching. Transcontinental lines are striving to reorganize service, which was disrupted during the past ten days by floods. Work of repairing and rebuilding washed-out bridges in mountain divisions particularly is being rushed under difficulties. Collections fair.

On Monday of this week Director-General of Railroads McAdoo issued a statement showing the imperative necessity that exists for releasing cars for further service and for relieving terminals which are now badly congested and at the same time issuing order No. 3. This order increases demurrage charges to a maximum of \$10 per car per day reached on the eighth day of detention beyond free time. The new demurrage rates will go into effect on Jan. 21.

Government Statistics on Rail Manufacture

Value of Product in 1914 Was More Than \$54,000, a Decrease of 35 Per Cent from 1909

Statistics have just been put out by the Bureau of the Census on iron and steel products manufactured in 1914 showing the production of steel rails and certain rail equipment. Table I shows the rail production in 1899, 1904, 1909 and 1914. The rail production in 1914, it will be noticed, was around 35 per cent less than in 1909.

Rail production in 1914 absorbed 10 per cent of the mill tonnage as com-

pared with 14.8 per cent in 1909, 17.2 per cent in 1904 and 21.6 per cent in 1899. Rail fasteners and rerolled or renewed rails absorbed around an additional 2 per cent.

Data on railroad spikes are available for 1914 only and show fifteen establishments engaged in their manufacture. The output of these mills was 1,366,177 kegs of 200 lb. each, having a total value of \$4,201,388.

Trolley Cord Still Advancing Uncertainties of Present Market Cause Supply Men to Hesitate to Make Quotations

Railway supply men in New York are very careful when it comes to quoting prices on any material of iron, steel or copper. The eccentricities of the market are apparently beyond their comprehension at times, so they state. On one particular article, namely trolley cord, the gyrations have been unusually hard to follow. Prices have been jumping right along, the latest, effective about two weeks since, going up 7 cents a pound. At that, immediate acceptance of the quotation must be made, or else the offer is subject to cancellation.

A reasonable time is allowed between the date when a quotation is asked and the placing of the order, otherwise a new condition is presented for both the seller and buyer. Not infrequently the factory intervenes with a higher figure than originally named, and no preliminary notice is given of the advance. This has led to no end of complications before an adjustment is reached. Just now the attitude of the seller of supplies and accessories is precarious on the matter of prices, which are likely to change without the slightest intimation from the producer.

Rails	1914	1909	1904	1899
No. establishments.....	15	13	14	
Tons.....	1,842,041	2,858,599	2,194,605	2,251,337
Value.....	\$54,009,918	\$81,128,295	\$58,256,750	\$46,533,159
Open-hearth—				
Tons.....	1,522,684	1,215,072	1,288,681	
Value.....	\$45,336,381	\$36,400,780	\$3,608,562	
Bessemer—				
Tons.....	319,357	1,643,527	2,065,024	
Value.....	\$8,673,537	\$44,727,515	\$54,627,488	
Rerolled or renewed rails—				
No. establishments.....	8	9	8	
Tons.....	63,671	106,352	99,530	
Value.....	\$1,438,237	\$2,683,017	\$2,480,328	
Rail fastenings (incl. splice bars, tie-plates, fishplates, etc.)—				
No. establishments.....	26	25	(*)	
Tons.....	349,307	396,911	174,055	
Value.....	\$11,526,956	\$14,488,412	\$5,663,052	

Figures not available.

* Includes 27,286 tons of alloy steel rails; titanium steel, 7395 tons; nickel-chrome steel, 4174 tons; manganese steel, 3864 tons; and kinds not specified, 11,853 tons.
 † Includes iron rails; 1904, 900 tons; value, \$20,700; 1899, 880 tons; value, \$31,180.
 ‡ Includes 1,522,362 tons of basic open-hearth, 144 tons acid open-hearth, and 178 tons of electric steel rails.

Steel Prices in Effect Until March 31

Current Quarter Contracts Calling for Later Deliveries Subject to Government Price Revision

President Wilson has approved the recommendation of the War Industries Board that the maximum prices heretofore fixed by the President upon the recommendation of the board upon ore, coke, pig iron, steel and steel products, subject to revision on Jan. 1, 1918, be continued in effect until March 31, 1918. No new contracts calling for delivery of any of said commodities or articles on or after April 1, 1918, are to specify a price unless coupled with a clause making the price subject to revision by any authorized United States government agency, so that all deliveries after that date shall not exceed the maximum price then in force, although ordered or contracted for in the meantime.

Particular attention is being paid by the steel interests to that part of the approved recommendation pertaining to contracts placed during the current quarter for later delivery. As stated, no prices are to be specified for deliveries later than March 31 except as subject to Government revision. The natural assumption, and this is borne out by the uneasiness of the steel producers, is that any government revision of prices will probably not be upward.

As matters now stand, therefore, contracts may be placed for certain quantities of steel product for delivery later than the current quarter at a certain price or not, but in any event subject to future Government price regulation, which at the present writing does not seem to be inclined toward higher prices.

Probable Market Effects of Federal Road Control

There seems every reason to believe that the assumption of control by the Federal government of the steam railroads will lead shortly to large orders for both rolling stock and road equipment. The purchases will undoubtedly be made under priority orders of the first class. In markets so far behind on orders as those for rolling stock and rails it becomes evident that buyers not falling in the preferred classes will find it more difficult than ever to obtain materials and equipment.

How far the control of electric railways will be taken over by the government is not known at this writing. Already it has been announced that the Lehigh Valley electric system has been taken over. In the event of a wide control of traction properties, it appears that early purchases will probably have to be made of freight rolling stock and rails.

Owing to the existing situation roads have been less careful in rail replacement than formerly. Consequently there is undoubtedly a considerable amount of rail of the country that badly needs replacement.

Just how these purchases are to be

financed is for the present a matter of speculation. It does seem certain, however, that nothing of any consequence will be done in the way of purchases for a month or more. Still, provided the government wishes, as has been repeatedly stated, to maintain the roads in as high a state of efficiency as possible, sooner or later orders of considerable size for new equipment of one kind or another must find their way to the manufacturers.

Market Develops for Sleet Scrapers

Deliveries Being Made Out of Stock With Feeling in Trade That Prices Will Go No Higher

As might be expected devices for removing sleet from wires were in strong demand during and following the recent snow storms in different parts of the country. A number of appliances of this kind are in the market, accomplishing their work along pretty much similar lines. Manufacturers of the sleet cutters, or scrapers as they are called, operating in this field, reported an immense sale.

While there has been no recent change in the price of sleet cutters, with the constant change in copper and brass the manufacturers frankly admit the possibility of a reduction in the near future. It was admitted that, in their judgment, prices were at peak, and that the tendency seemed to be for shorting of prices rather than increasing. Deliveries are said to be prompt, as the goods are kept in stock. The greatest difficulty just now was in securing skilled workmen. Mechanics of the ordinary kind in their line were plentiful enough, but the men desired were scarce and hard to engage at any reasonable wages.

Confusion Regarding Priority Transportation

Fuel Administrator Announces That All Priority Orders Were Suspended on Dec. 31

The Fuel Administration issues the following:

"Despite the fact that formal announcement was made that all priority orders in connection with freight shipments were suspended at midnight Dec. 31, considerable confusion apparently exists in many quarters, as evidenced by many telegrams to the United States Fuel Administration, inquiring as to the status concerning priorities."

The following typical answer to these telegrams is being sent out by the Fuel Administration:

"By direction of Director-General McAdoo, all priority orders heretofore issued with respect to transportation have been suspended and no further priorities may be claimed thereunder. Future orders for priorities will be issued in emergencies under Mr. McAdoo's direction as occasion may require."

Increased Demand for Trolley Wire Noted

Stories Stimulate Orders for Maintenance Equipment—Reduction Noted in the Price for Wire

Buying has about reached the minimum level, but maintenance of track and transmission lines must be kept in workable condition at all hazards, the selling trade takes satisfaction in saying. This means something, and the manufacturers and handlers of trolley wire declare they are fortunate in having reasonably heavy orders placed with them for prompt delivery.

At this time of the year there is always a certain amount of movement in trolley wire, but the recent snow storms have occasioned the buying of an additional quantity. A number of large orders have been recently booked from railways in the eastern territory, a greater portion of which was for quick delivery. The producers, however, commenting upon the orders, stated it was evident only necessity compelled the purchase. The traction companies, it was well understood, were finding it difficult to secure funds to maintain their properties in proper shape, let alone for extensions, and also steam roads for the electrification of parts of their systems in contemplation. At any rate, the orders, such as they were, and representing a considerable amount at that, declared one manufacturer, were welcome, although the major facilities of his plant are given over to governmental work.

Another manufacturer, in speaking of the buying of trolley wire by the railways, stated the quantity was above the average for the winter season, and was doubtless for maintenance purposes only.

The price of trolley wire has been gradually lowered during the past two months, totaling in all a reduction in the neighborhood of 10 per cent. When one of the largest manufacturers of copper wire was asked about the current status of base he promptly said "there is no base." The same authority averred that under the pressure of competition and eagerness for orders base had been quoted at 26 cents for large interests, although 30 cents is the generally recognized figure.

Weatherproof wire is also on the downward scale, according to various sources of information. It was stated that the cost of weatherproof had been greatly enhanced by the high cost of cotton, which had advanced considerably. At one time the covering used for weatherproof wire was a waste or by-product, but now plays a large part in adjusting wire prices. With the reduction, however, in copper ingots and consequently base wire the price of weatherproof has been readjusted. On a large order 28 cents was quoted last week for weatherproof.

In 100 lb. lots weatherproof wire was quoted Monday morning of this week for 34¼ to 35¼ cents in the New York market and 38 to 38.35 cents in Chicago.

Rolling Stock

Galesburg (Ill.) Railway & Light Company suffered the loss of a car by fire Dec. 27, the damage figuring \$2,500.

Toronto & York Radial Railway Company, Toronto, Can., is reported as negotiating for the purchase of four cars.

Long Island Railroad Company, Long Island City, N. Y., lost a storage and office building by fire on the night of Dec. 30. Two freight cars besides were destroyed.

Illinois Traction System, Peoria, Ill., on Dec. 31 had two passenger coaches and a motor car burned in a fire, which partially destroyed its shops and barns at Staunton, Ill. The damage is estimated at \$35,000.

Sandwich, Windsor & Amherstberg Railway, Windsor, Ont., Can., has added to its rolling stock recently three single truck p.a.y.e. cars built in Canada and two double truck steel cars built in the United States.

Pensacola (Fla.) Electric Company recently put in commission two motor cars on its Bayshore line. The cars, which accommodate ninety passengers each driven by two 50 hp. motors respectively, were on delivery since early in August last.

J. G. Brill Company, Philadelphia, Pa., is working on parts for the cars recently damaged by fire in the barn of the Trenton & Mercer County Traction Corporation, as reported in last week's ELECTRIC RAILWAY JOURNAL. One of the damaged cars was repaired at the Trenton repair shop. The cars are valued at \$7,500 each.

Georgia Railway & Power Company, Atlanta, Ga., have installed trailer cars on its line to Camp Gordon. Old gondola cars were rebuilt in the company's shops, the motors being removed and new trucks, with 26-in. wheels, substituted. Couplers and air-brakes were installed. Work on several p.a.y.e. cars has also been begun in the company's plant.

Bangor Railway & Electric Company, Bangor, Me., has recently placed an order for three passenger trolley cars of the one-man safety type. They are

said to cost \$6,000 each, f.o.b. St. Louis. Delivery is expected in March. Considering the trouble the Lewiston, Augusta & Waterville system claims to have had in getting delivery of new cars ordered many months ago, there is some speculation as to whether Bangor gets her new cars on time.

New Advertising Literature

Consolidated Expanded Metal Company, Braddock, Pa.: "The Military Camps of Our Allies," twelve-page pamphlet descriptive of the buildings for housing troops in France, Belgium and Great Britain employing expanded metal lathing with cement plaster. There are many illustrations.

Moller & Schumann Company, Brooklyn, N. Y.: Bulletin No. 3 treats of the company's air drying and baking Hilo White enamels. Each article is described as to the kind of work for which it is suited. The method of handling the enamel in order to assure satisfactory results is also given.

Arthur D. Little, Inc., Cambridge, Mass.: "The Little Journal" for December contains plans and perspective view of the new Charles River Road Laboratory of the company at Kendall Square, Cambridge. The leading article is on conservation of our national resources. Instances are pointed out of the waste going on in potash, fuel, labor, etc., when the greater part of these possessions could be saved by the application of scientific principles.

Wilson Welder & Metals Company, New York: Electric welding catalog No. 2. A book, descriptive of the Wilson system of electric welding which was developed on a large trunk line railroad several years ago. An especial claim made for this system is the control over the heat at the point of application, so that the heating can be kept constant and the welding uniform. Any number of welders can work from one large machine. Reduction in energy consumption and labor, as compared with other electric welding outputs, is also claimed. The company also supplies specially prepared welding metal. The catalog is well illustrated and contains a number of tables.

Trade Notes

McGovern & Company, Inc., New York, N. Y., dealers in second-hand machinery, increased their capital from \$150,000 to \$200,000.

Ralph C. Davison, for the past six years with the American Mason Safety Tread Company, has joined the American Abrasive Metals Company, makers of Feralun safety treads and anti-slip surfaces.

H. T. Glover, formerly sales manager of the Esterline Company, Indianapolis, Ind., who enlisted last June with the Canadian Expeditionary Force, is about to start for Europe, if he has not already done so, as a member of the divisional signalers of the Canadian forces. Mr. Glover is a British subject, which accounts for his enlistment in Canada.

W. Jerry Stanton has resigned from the sales department of the General Electric Company, Philadelphia office, to become sales manager of the Railway Improvement Company, New York. Mr. Stanton is a native of Schenectady and since his school days he has been employed in the testing, engineering and sales departments of the General Electric Company.

General Electric Company, Lynn, Mass., will soon begin the construction of three new buildings. The plans call for a two-story brick and concrete office building 142 ft. by 60 ft.; a one-story building 226 ft. by 582 ft. to be constructed of steel, brick, concrete and cement plaster, to be used for general manufacturing purposes, and a two-story building 67 ft. x 340 ft. to be used for a cleaning and core shop.

New York Municipal Railway Corporation, Brooklyn, N. Y., that opens its new subway extension from Fourteenth Street to Times Square (Broadway division, New York) to-day (Jan. 5), will have Johnson fare boxes installed on the stations. The Railway Appliance Company, which is Eastern agent for the Johnson Fare Box Company, has encountered more or less difficulty in getting delivery on the boxes owing to the embargo. Other shipments are in transit.

RAILWAY MATERIAL PRICES

	Jan. 3	Jan. 9
Rubber-covered wire base, New York, cents per lb.	30	30
Wire, weatherproof (100 lb. lots), cents per lb.		
New York	34 1/4-38	34 1/2-35 1/4
Chicago	38-38.35	38-38.35
Rails, heavy, Bessemer, Pittsburgh	\$38.00	\$38.00
Rails, heavy, O. H. Pittsburgh, per gross ton	\$40.00	\$40.00
Wire nails, Pittsburgh, per 100 lb.	\$3.50	\$3.50
Railroad spikes, 9/16 in., Pittsburgh, per 100 lb.	\$3.90	\$3.90
Steel bars, Pittsburgh, per 100 lb.	\$5.00	\$5.00
Sheet iron, black (24 gage), Pittsburgh, per 100 lb.	\$5.80	\$5.80
Sheet iron, galvanized (24 gage), Pittsburgh per 100 lb.	\$4.85	\$4.85
Galvanized barbed wire, Pittsburgh, cents per lb.	\$4.35	\$4.35
Galvanized wire, ordinary, Pittsburgh, cents per lb.	\$3.95	\$3.95
Cement (carload lots), New York, per bbl.	\$2.22	\$2.22
Cement (carload lots), Chicago, per bbl.	\$2.31	\$2.31
Cement (carload lots), Seattle, per bbl.	\$2.65	\$2.65
Linsed oil (raw, 5 bbl. lots), New York, per gal.	\$1.26	\$1.29
Linsed oil (boiled, 5 bbl. lots), New York, per gal.	\$1.27	\$1.30
White lead (100 lb. keg), New York, cents per gal.	10	10
Turpentine (dbl. lots), New York, cents per gal.	48 1/2	48

*Nominal.

OLD METAL PRICES—NEW YORK

	Jan. 3	Jan. 9
Copper, ingot, per lb.	23 1/2	23 1/2
Lead, cents per lb.	6 1/2	6.70
Nickel, cents per lb.	50	50
Spelter, cents per lb.	7.82 1/2	7.92 1/2
Tin, Straits, cents per lb.	\$85.50	\$85.50
Aluminum, 98 to 99 per cent, cents per lb.	36	36

NEW YORK METAL MARKET PRICES

	Jan. 3	Jan. 9
Heavy copper, cents per lb.	22	22
Light copper, cents per lb.	19 1/2	19 1/2
Red brass, cents per lb.	17 1/2	17 1/2
Yellow brass, cents per lb.	14 1/4	14 1/4
Lead, heavy, cents per lb.	6	5 7/8
Zinc, cents per lb.	5 1/2	5 1/2
Steel car axles, Chicago, per net ton	\$42.42	\$42.42
Old carwheels, Chicago, per gross ton	\$35.00	\$35.00
Steel rails (scrap), Chicago, per gross ton	\$33.00	\$33.00
Steel rails (relaying), Chicago, per gross ton	\$55.00	\$60.00
Machine shop turnings, Chicago, per net ton	\$17.50	\$17.50